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CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD UNIVERSITY.

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CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD UNIVERSITY,—No. CII.

1. STUDIES IN THE BROMELIACEAE.—IV.

By Lyman B. Smith.

Presented January 11, 1933. Received February 6, 1933.

The following paper places on scientific record the novelties to be included in the publication of the *Bromeliaceae* of Trinidad and also such new or noteworthy species as have come to the writer's attention in a general study of the family during the past year. The form used is that of previous papers in this series.

In this paper and the succeeding one, the authors are indebted to the following institutions for the opportunity to study their material or photographs thereof: the Herbarium of the Royal Botanic Gardens of Trinidad and Tobago (Trin), the Gray Herbarium of Harvard University (G), the New York Botanical Garden (NY), the United States National Museum (US), the Field Museum of Natural History (FM), the Royal Botanic Gardens at Kew (K), the Missouri Botanical Garden (Mo), the Riks Museum at Stockholm (S), the Biological Institute of São Paulo (SP), the Herbarium of the Botanical Museum at Berlin-Dahlem (B), the British Museum of Natural History (BM), the Conservatory of Botany at Geneva (Gen), the National Museum of Rio de Janeiro, the National Museum of Natural History of Buenos Aires (BA), the private herbarium of Cornelio Osten, Montevideo, Uruguay, the Dudley Herbarium of Stanford University, and the Brooklyn Botanic Garden (Bk).

Aechmea dichlamydea Bak. var. **trinitensis**, var. nov., spicis omnibus brevissime crasseque stipitatis. Pl. I, fig. 3.

TRINIDAD: Epiphytic, Broad Walk, Trinidad Botanic Garden, Port of Spain, 1890, *J. H. Hart in Herb. Trin. 4089* (Trin, TYPE, phot. G; NY); 1889, *Broadway 3627* (Trin); indefinite, 1867, *Prestoe* (K); *Herb. Trin. 916* (Trin).

Canistrum (Wittrockia) minutum (Mez), comb. nov. *Nidularium minutum* Mez in Fedde Rep. Spec. Nov. xvi. 4 (1919). Pl. I, figs. 4–5.

While at Alto da Serra, the type locality of *Nidularium minutum*, I collected what I took from its habit to be a close relative of *Nidularium Scheremetiewii*. However, a dissection of the fresh flowers revealed that each petal bore two finely divided scales a short distance above the base, thus making it a *Canistrum*. Quite evidently it had

never been described under *Canistrum*, but its habit suggested that it might have been under *Nidularium* and its close correspondence to the description of *N. minutum* confirmed this surmise.

Canistrum minutum is most nearly related to *C. amazonicum*, from which it differs in its nearly symmetric evenly pale green sepals and narrower leaves.

BRAZIL: São Paulo: Estação Biologica, Alto da Serra, alt. 800–900 m., 1924. *D. Lemos in hb. S. P. 9480* (G, SP); 1929, *L. B. Smith, F. C. Hoehne & M. Kuhlmann 1829* (G); *J. King in hb. S. P. 24579* (G, SP).

Deuterocohnia Meziana O. Kuntze ex Mez emend. L. B. Smith, bracteis florigeris acutis vel obtusis: floribus distincte pedicellatis: sepalis suboblongis, late obtusis vel subtruncatis, asymmetricis. Mez in DC. Mon. Phan. ix. 465 (1896). *D. paraguariensis* Hassler in Ann. Conserv. & Jard. Bot. Genève, xx. 298 (1919). *D. divaricata* Mez in Fedde Rep. Spec. Nov. xvi. 9 (1919). Pl. I, figs. 1–2.

BRAZIL: Matto Grosso: Corumbá, 1892, *O. Kuntze* (NY, type; phot. G); same, rupicolous on calcareous rocks, 1911, *Hoehne 3543* (Mus. Nac. Rio). PARAGUAY: calcareous banks, Sierra de Amambay, Cerro Margarita, northern Paraguay, 1908, *Rojas 11098* (Gen, type of *D. paraguariensis*, phot. G; B (?), type of *D. divaricata*); Colonia Risso, 1896, *Anisits 2419* (S); Itapucúmi, 1893, *Lindman A 2097* (S); Puerto Fonciere, 1916, *Rojas 2270* (Hb. Osten).

Owing to the fact that the type of *Deuterocohnia Meziana* consisted of young material, the sepals were erroneously described as acuminate, but a careful dissection shows them to be nothing of the sort. All the differences which are to be inferred from the descriptions of *D. Meziana* and *D. paraguariensis* are nullified either by mistakes in the description of the former of by a consideration of the difference of condition. The type of *D. Meziana* is young material poorly preserved, while that of *D. paraguariensis* is a mature specimen excellently preserved.

Guzmania plicatifolia, spec. nov., epiphyta vel terrestris, acaulis, florifera ad 9 dm. alta: foliis 8 dm. vel ultra longis, minutissime obscureque lepidotis; lamina lineari, 2 cm. lata, longe acuminata, valde plicata: scapo 8 mm. diametro, erecto, mox glabro; scapi bracteis foliaceis, erectis, dense imbricatis: inflorescentia laxe bipinnata, e spicis ad 15 composita, subcylindrica, 3 dm. longa; bracteis primariis ovato-lanceolatis, amplis, membranaceis, mox disruptis, infimis quam spicae multo longioribus: spicis breviter crasseque stipitatis, crasse ovoideis, 4–5 cm. longis, dense 12–15-floris; bracteis florigeris imbricatis, late ellipticis vel ovatis, acutis, 25 mm. longis, sepala bene superantibus, membranaceis, prominenti-venosis, subglabris: floribus solum perjuvenilibus vel fructiferis cognitis, sub-

sessilibus; sepalis liberis, anguste lanceolatis, acutis, 16 mm. longis, glabris, sulcatis: capsula tenuiter ellipsoidea, sepala subaequanti. Pl. II, figs. 4–5.

COSTA RICA: San José: forests, La Palma, alt. 1459 m., 1898, *Tonduz 12533* (US, TYPE; phot. G); Cartago: Jocosal, south of Cartago, alt. 1500 m., 1920, *Lankester K 39* (K).

This plant is quickly distinguished from the great majority of species of *Guzmania* by its strongly plicate leaves, but resembles its near relative, *G. calamifolia* André, in this particular as well as in its very thin bracts. It differs from *G. calamifolia* in its elongate inflorescence, broad primary bracts, and short stout spikes.

Guzmania rosea, spec. nov., acaulis, 4–5 dm. alta: foliis rosulatis, ad 6 dm. longis, supra glabris, subtus dense minuteque brunneo-lepidotis, exterioribus ad vaginas atro-brunneas reductis; laminis foliorum interiorum ligulatis, 25–30 mm. latis, late acutis, ex sicco concoloribus: scapo erecto, glabro; scapi bracteis dense imbricatis, late ellipticis, apice acuminatis, infimis omnino supremis solum apice lepidotis: inflorescentia simplicissima, laxa, 25 cm. longa: bracteis florigeris orbicularibus, sepala involventibus, apiculatis, roseis, ad apicem extremum lepidotis, infimis sepala subaequantibus, alteris quam sepala bene brevioribus: floribus patentibus, ad 5 mm. pedicellatis; sepalis glabris, 38 mm. longis, ad 25 mm. connatis, late obtusis, paulo asymmetricis; petalis 50 mm. longis, alte conglutinatis, ex sicco aureis, obtusis; stylo gracili, petala subaequanti, stamina paulo superanti, ovario tenuiter pyramidato. Pl. II, fig. 6.

COLOMBIA: El Valle: on rocks, Poreto on the Rio Dagua, *Lehmann K 362* (K); Cauca: Timbiqui, 1903, *Lehmann K 355* (K, TYPE; phot. G).

The simple inflorescence and large high-connate sepals of this species place it near *G. musaica* (Linden) Mez, from which it is immediately distinguishable by its lax elongate inflorescence and concolorous leaf-blades.

Tillandsia (§ **Allardtia**) **Archeri,** spec. nov., epiphyta, acaulis, 27 cm. alta: foliis rosulatis, 2 dm. longis, utrinque dense adpresseque lepidotis; vaginis magnis, castaneis, late ovatis; laminis anguste triangularibus, acuminatis, basi 15 mm. latis, subtus cinereis: scapo erecto, gracili, quam folia paulo breviori; scapi bracteis foliaceis, internodia multo superantibus: inflorescentia ovoidea, subdense bipinnata, 7 cm. longa, fulgide rubra; bracteis primariis late ovatis, lepidotis, infimis longe caudatis, quam spicae axillares bene longioribus: spicis lanceolatis, subsessilibus, 5–6-floris, 25–30 mm. longis; bracteis

florigeris laxe imbricatis, rhachin vix obtegentibus, oblongo-ovatis, 12–15 mm. longis, quam sepala distincte longioribus, carinatis, apice incurvis, mox glabris, membranaceis, valde nervatis: floribus subsessilibus; sepalis oblongis, obtusis, 12 mm. longis, sparse lepidotis vel glabris, nervatis, posticis alte connatis; petalis oblongis, late obtusis, ca. 14 mm. longis; staminibus styloque inclusis. Pl. I, figs. 14–15.

COLOMBIA: ANTIOQUIA: Santa Elena, 1930, *W. A. Archer 1204* (US, TYPE; phot. G).

In the key in Mez's monograph this plant runs down to *T. compacta* from which it differs in its acuminate leaf-blades. In habit it more closely resembles *T. myriantha*, but differs in its highly connate posterior sepals. The spikes are suggestive of those of *T. rubella* and *T. oroyensis*.

Tillandsia flexuosa Sw. Authors have disagreed on the application of this name, but it seems best to use it in the sense of including the later *T. aloifolia* Hook. as a synonym. In the process of identifying and publishing on his West Indian collections, Swartz considered certain of his specimens to be identical with the plant figured by Jacquin in his Selectarum Stirpium Americanarum Historia t. 63, and doubtfully referred to *T. tenuifolia* L. Swartz recognized that Jacquin's plant was misdetermined and made the new name *T. flexuosa* for it. Unfortunately Swartz appears to have misapplied the name in identifying his own specimens, and this error has been used by some authors to give a different interpretation to the species and to reduce it to synonymy under *T. utriculata*. Such action would be justifiable had *T. flexuosa* been published as a new species, but it was obviously published as a new name and should take its significance from *T. tenuifolia* Jacq. which is generally admitted to be the same as *T. aloifolia* Hook.

Tillandsia (§ **Anoplophytum**) **latisepala**, spec. nov., caulescens, omnino argenteo-lepidotis: foliis dense quaquaverse dispositis, dense subpruinoseque lepidotis; vaginis inconspicuis; laminis patentibus, anguste triangularibus, 20–25 cm. longis, ad 17 mm. latis, ad apicem involutis: scapo gracili, erecto, leviter curvato, 15 cm. longo; scapi vaginis imbricatis, scapum omnino obtegentibus, ellipticis, longe caudatis: inflorescentia simplicissima, quaquaverse florigera, subdense ovoidea, 6 cm. longa: bracteis florigeris submembranaceis, latissime ovatis, sepala superantibus, infimis caudatis, 3 cm. longis, flores superantibus: floribus 22 mm. longis, subsessilibus; sepalis liberis, crasse coriaceis, 11 mm. longis, 9 mm. latis, apiculatis, dense pruinose-

que albido-lepidotis; petalis ex sicco albis, angustis, obtusis; filamentis prope apicem transverse plicatis; stylo elongato, e corollae fauce emergenti, stamina paulo superanti. Pl. I, figs. 6–7.

PERU: Cuzco: Valle de Santa Ana, Huadquina, alt. 1500 m., 1931, *F. L. Herrera 3313* (US, TYPE; phot. G).

This species is easily distinguished from its near relatives by its very broad thick-coriaceous sepals.

Tillandsia xiphioides Ker-Gawl. The following specimen constitutes the first Bolivian record for the species:

BOLIVIA: Potosi: prov. Nor-Chichas, on rocks near San Antonio, 1931, *M. Cardenas 93* (G).

Vriesia Alfarovii Mez. The discovery of additional material of this species necessitates a slight emendation of the original description and a large extension of range as follows:

Inflorescentia laxe paniculata; bracteis primariis eis scapi similibus, quam spicae axillares multo brevioribus; spicis lateralibus suberectis, ad 24 cm. longis, breviter stipitatis, basi a prophyllis 2 auctis, spica terminali basi a prophyllis multis scapi bracteis exacte similibus aucta.

COLOMBIA: El Valle: epiphytic, coastal thickets, Buenaventura, alt. 0–10 m., 1922, *Killip 11736* (G).

The Killip specimen is a very good match for the type material (*Tonduz 9883*, from Costa Rica) in the Gray Herbarium, but shows a larger proportion of the inflorescence. Had merely the terminal spike of the Killip specimen been collected, it would have appeared to be a simple inflorescence with a section of the scape, on account of its long sterile base. This, evidently, is just what happened in the case of the type material.

Vriesia Broadwayi, spec. nov., epiphyta, semimetralis: foliis 3 dm. longis; vaginis ellipticis, utrinque dense minuteque ferrugineo-lepidotis; laminis anguste lanceolatis, acuminatis, 2 cm. latis, supra glabris, subtus dissite lepidotis: scapo erecto, gracili; scapi bracteis dense imbricatis, dissite lepidotis, inferioribus foliaceis, superioribus late ellipticis, apiculatis, pallido-brunneis: inflorescentia simplici, racemosa, optime secunda, 7–9 cm. longa, laxe 5–7-flora, minutissime ferrugineo-lepidota; rhachi flexuosa; bracteis florigeris late ovatis, late acutis, brunneis, ad 22 mm. longis, quam sepala distincte brevioribus, cum floribus secunde versis: floribus crasse stipitatis; sepalis late ellipticis, rotundatis, 18 mm. longis, subcoriaceis, levissime nervatis, margine pallido excepto atro-brunneis; petalis ignotis: capsula subcylindrica, 35 mm. longa. Pl. I, figs. 9–10.

TRINIDAD: Heights of Aripo, 1922, *W. E. Broadway 9916* (Trin, TYPE; phot. G; K; NY), Mt. Tucuche, 1920, *N. L. Britton, Hazen & Mendelson 1258 in part* (G), 1929, *Broadway 7096* (K).

This species seems to be more nearly related to *V. oligantha* (Bak.) Mez than to any other known species. It differs in its finely ferruginous-lepidote narrower leaves and smaller sepals.

Vriesia Hoehneana, spec. nov., perconspicua, plerumque bimetralis vel ultra: foliis rosulatis, ad 5 dm. longis, dorso minutissime brunneo-lepidotis; vaginis magnis, late ellipticis, atro-castaneis; laminis ad 8 cm. latis, pallide viridibus, late acutis, apiculatis, venulis sinuosis transversalibus dense ornatis: scapo perelongato, basi ad 14 mm. diametro; scapi bracteis infimis foliaceis, quam internodia multo longioribus, supremis late lanceolatis, internodia subaequantibus: inflorescentia laxissime pauciramosa vel simplici; bracteis primariis eis scapi similibus, quam bases steriles spicarum multo brevioribus; spicis ad 28 cm. longis, 8–16-floris, in inflorescentia composita spicis lateralibus divergentibus, graciliter stipitatis, basi unibracteolatis vel nudis, spica terminali basi a bracteis multis scapi bracteis exacte similibus aucta; bracteis florigeris cum floribus secunde versis, ad 32 mm. longis, internodia subduplo aequantibus, suborbicularibus, latissime acutis vel apiculatis, ad apicem versus obtuse carinatis paulo incurvatisque, flavis, sublaevibus, minutissime obscureque brunneo-lepidotis: floribus bene secundis, ad 10 mm. stipitatis; sepalis ad 34 mm. longis, anguste ellipticis, utrinque sed praesertim intus minute brunneo-lepidotis; petalis citrinis, ad 5 cm. longis, basi ligulis binis magnis auctis; staminibus inclusis, filamentis ad apicem valde incrassatis. Pl. I, figs. 11–13.

BRAZIL: São Paulo: in campo, Alto da Serra, Estrada do Vergueiro, 1920, *F. C. Hoehne 4724* (G, SP); Campo Grande, 1924, *F. C. Hoehne 9478* (G, SP); in campo, Estação Biologica, Alto da Serra, alt. 800–900 m., 1929, *L. B. Smith 1945* (G, TYPE).

This species is a native of the open rolling campo, and when seen in the field is unmistakable on account of its extremely elongate scape and few-branched or simple inflorescence. The spikes and flowers closely resemble those of *V. hieroglyphica* and *V. tessellata*, but these both have many-branched inflorescences with the sterile base of the terminal spike no more elongate than in the lateral ones. In the long scape-like base of the terminal spike *V. Hoehneana* resembles *V. Alfarovii*, but differs from that species in its much narrower sepals. The character of having the sepals strongly lepidote inside is a rather frequent one in the section *Xiphion* but has not been particu-

larly noted. The fine irregular cross-veining of the leaves is the same type as found in *V. platynema* and figured by Gaudichaud (Atl. Bonite, t. 66 (1846)).

In Mez's monograph this species runs down to *V. Tweediana*, but as shown further on in the present paper the name is quite evidently misapplied. Since no other name appears applicable to the specimens which Mez used in making his description of *V. Tweediana*, and since their description is the only one which does not show distinct differences from the above-cited specimens, it becomes necessary to erect a new species based on the recent material from São Paulo but quite probably including some of the specimens placed under *V. Tweediana* by Mez.

Hoehne has figured a small specimen of the species under the name of *V. tessellata* on page 97 of the Album da Secção de Botanica do Museu Paulista.

Vriesia Rodigasiana Morr. in Ill. Hort. xxix. 171, t. 467 (1882). *Tillandsia Tweediana* Bak. in Journ. Bot. xxvi. 138 (1888); Brom. 224 (1889). *Vriesia Tweediana* Mez in Mart. Fl. Bras. iii. pt. 3, 561 (1894).

Tillandsia Tweediana was founded on *Tweedie 1342* and *Glaziou 16467*. The Tweedie specimen is conspecific with *Vriesia Rodigasiana*, while the Glaziou specimen later became the type of *Vriesia friburgensis* Mez. In his choice of name Baker evidently considers the Tweedie specimen as the type, and Mez further strengthens this position by removing the only other number of the original citation. Thus it seems best to avoid confusion and let *Vriesia Tweediana* lapse into synonymy rather than to use it as antedating *V. friburgensis*.

Mez treated *V. Tweediana* as a valid species under the section *Xiphion*, disregarding the fact that the type shows the stamens longer than the petals and that Baker so described them. The reason for this confusion is not yet solved, but it may lie with the Sello specimens, which Baker added to this species in his Handbook of Bromeliaceae and which Mez retained. Certainly there is much in Mez's description which does not fit the type, and which leads one to believe that he wrote from other specimens which he thought conspecific.

Vriesia tucumanensis Mez. This species should include *V. caldasiana* Mez as a synonym. When the two species were originally described by Mez in De Candolle's Monographiae, they were supposedly distinguished by *V. tucumanensis* having the stamens exserted, and by *V. caldasiana* having them included. In all other respects they appear very similar. Examination of type material of *V. caldasiana*

(*Mosén 4436*) from the Riks Museum at Stockholm shows that the stamens, contrary to the description, are exserted quite definitely at anthesis. Mez evidently saw immature material only.

Any objections to the equality of the two species on the ground of the wide geographic separation of their type localities are answered by the number of intermediate stations which have recently come to light.

BRAZIL: MINAS GERAES: epiphytic, banks of the Rio Verde, Caldas, 1876, *Mosén 4436* (S, ISOTYPE of *Vriesia caldasiana;* phot. G); Pouzo Alegre, 1929, *Hoehne 24550* (G, SP); PARANÁ: Ponta Grossa, 1903, *Dusén 2699* (S); Morretes, 1904, *Dusén 4357 in part* (S); RIO GRANDE DO SUL: Silveira Martins, Val Veneta, 1893, *Lindman A 1331* (S). PARAGUAY: Villa Rica, 1893, *Lindman A 1793* (S); 1919, *Jörgensen 4489* (Dudley Hb.). ARGENTINA: JUJUY: near Laguna de la Brea, 1901, *Fries 382* (S); FORMOSA: indefinite, 1919, *Jörgensen 2803* (G); TUCUMAN: Sierra de Tucuman, 1882, *F. Schultz* (B, TYPE; phot. G); Yerba Buena, Naranjal, Dept. Tafi, 1918, *Schreiter 738, 27/2331 in hb. BA* (G, BA, Hb. C. Osten).

In establishing the name of this species, *V. tucumanensis* has been selected rather than *V. caldasiana*, because it appears earlier in the same work and still more because it was the one to be described correctly as regards the stamens.

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2. THE BROMELIACEAE OF TRINIDAD AND TOBAGO.

BY W. E. BROADWAY AND L. B. SMITH.

IN THE following treatment the authors feel that they have employed a very satisfactory means of combining and correlating the field and herbarium studies of tropical plants. One contributes a knowledge of local conditions, geography, climate and history, and the characters of the plants which are lost in herbarium specimens. The other supplies the information gained from the study of the wide range of specimens and literature to be found only in the larger herbaria, thus correlating local and general information. By keeping in close touch they are able to answer questions in a short time that would require years for either one alone.

The senior author's interest in the *Bromeliaceae* dates from his experiences as a student-gardener at Kew when he had charge of the living material to which the late J. G. Baker was constantly referring in the preparation of his "Handbook of the Bromeliaceae." Since then in coming to the West Indies and most particularly to Trinidad he has continued to collect and study the family, discovering a number

of rare or new species in the process. The junior author's article on "The *Bromeliaceae* of British Guiana."[1] suggested the present treatment as a natural sequel.

The island of Trinidad ranks very high in tropical America for the thoroughness of its botanical exploration. Few of the West Indies can compare with it in this regard and Gleason in his survey "The progress of botanical exploration in tropical South America"[2] rates it as one of twelve restricted regions which are considered as adequately known. Consequently it is not surprising that the present article required the description of but two novelties, although a number of previously described species have been added to the flora. Tobago is distinctly less known than Trinidad and has only about a third as many recorded species of *Bromeliaceae*. However, the much more uniform topography and smaller area of Tobago make it seem unlikely that further collecting will greatly affect this difference between the two island floras.

The two striking regional features of the Trinidad *Bromeliaceae* are the strong development of the genus *Bromelia* on the Bocas Islands and Patos between the northwest corner of Trinidad and Venezuela, and the localizing of the rare *Glomeropitcairnia erectiflora* and most of the Trinidad endemics, *Vriesia Broadwayi*, *V. stenostachya*, *Gravisia aripensis* and *Aechmea portecoides*, in the rain-forest of the mountainous north coast. The two remaining Trinidad endemics, *Tillandsia subulifera* and *Aechmea dichlamydea* var. *trinitensis* are still too imperfectly known to be said to characterize any particular region, and as yet no other strong local tendencies have been observed in the non-endemic species.

Slightly less than half of the species of Trinidad and Tobago reappear in Venezuela, but this is explained largely by the relative lack of botanical exploration in the latter country. There are a large number of species which seem to have come south from the other Antilles and about an equal amount from Brazil and the Guianas.

The great majority of the species in this treatment have already found favor in cultivation. Several were grown over one hundred years ago, and the introduction of *Bromelia chrysantha* in Europe dates before 1797. So far as known the following species have not yet been tried by the horticulturists: *Glomeropitcairnia erectiflora*, *Tillandsia subulifera*, *tricicca*, *micrantha*, *subimbricata*, *rubra*, *didistichoides* and *complanata*, *Vriesia stenostachya*, *macrostachya*, *Broadwayi*, *albi-*

[1] Contrib. Gray Herb. lxxxix. 46 (1930).
[2] Bull. Torr. Bot. Club, lix. 21 (1932).

flora and *procera*, *Guzmania megastachya*, *Catopsis Berteroniana* and *sessiliflora*, *Hohenbergia oligosphaera* and *Aechmea portcoides*, although their attractive or bizarre appearance, as indicated in their descriptions, strongly recommends them. For the most part they are very rare or local species and have thus escaped attention, but it seems strange that no record can be found of the cultivation of such a widespread and striking species as *Tillandsia rubra*.

The generic sequence of Harms[1] has been adopted for the present work since it shows better than any other system the natural development from simple to complex forms. However, it has seemed best to retain the broader generic limits indicated by Mez in such cases as *Bromelia*, *Vriesia* and *Guzmania*.

The general acknowledgements and the abbreviations of herbaria cited are to be found on page 145. The authors are particularly indebted to Prof. Gunnar Samuelsson of the Riks Museum at Stockholm, to Mr. J. E. Dandy of the British Museum of Natural History and to Mr. N. Y. Sandwith of the Royal Botanic Gardens at Kew for their aid in settling troublesome questions on the identity of types.

BROMELIACEAE J. St.-Hil. Herbs or rarely shrubby perennials, mostly epiphytic. Leaves spirally arranged, usually basal, dilated-sheathing below, simple, entire or spinulose-serrate, bearing peltate scales, at least when young, and these serving to hold moisture. Inflorescence simple or paniculate, of spikes or racemes, usually bearing brightly colored conspicuous bracts. Flowers perfect in all the species of Trinidad and Tobago. Perianth heterochlamydeous, the segments free or variously joined. Stamens 6, filaments free or joined to the petals or to each other. Style 3-parted. Ovary inferior to superior, 3-celled. Fruit capsular or baccate. Seeds naked, winged, or plumose. Embryo small, situated at the base of the copious mealy endosperm. About 50 genera and 1500 species, strictly confined to tropical and subtropical America.—Expos. Famil. i. 122–5, t. 19 (1805); Beer, Fam. Brom. 1–271 (1857); Benth. & Hook. f. Gen. iii. 657–670 (1883); Wittm. in Engler & Prantl, Nat. Pflanzenf. ii. Abt. 4, 32–59 (1887–8); Bak. Handb. Brom. 1–243 (1889); Mez in Mart. Fl. Bras. iii. pt. 3, 173–634 (1891–4); Mez in DC. Mon. Phan. ix. 1–990 (1896); Harms in Engler & Prantl, Nat. Pflanzenf. ed. 2, xv a. 65–159 (1930).

[1] Harms in Engl. & Prantl, Nat. Pflanzenf. 2 Aufl., xv a. 65 (1930).

Key to Genera.

1. Ovary wholly or in part superior: fruit a capsule: seeds variously appendaged.
2. Seeds with an entire caudate appendage at each end, not plumose: leaves often somewhat spinulose-serrate: ovary only part superior.....Subfamily *Pitcairnioideae*.
1. *Pitcairnia*.
2. Seeds plumose: leaves always entire.....Subfamily *Tillandsioideae*.
3. Seeds plumose at both ends: ovary only half superior.
Tribe *Glomeropitcairnieae*.
2. *Glomeropitcairnia*.
3. Seeds plumose only at base or apex: ovary wholly or almost wholly superior.....Tribe *Tillandsieae*.
4. Plume of the mature seed straight: sepals symmetric or if asymmetric then the spikes distichous-flowered.
5. Petals free: inflorescence of one or more distichous-flowered spikes, if rarely polystichous then simple and the leaves long-acuminate.
6. Petals naked.....3. *Tillandsia*.[1]
6. Petals each bearing 2 scales at base.....4. *Vriesia*.[1]
5. Petals joined or closely agglutinated: inflorescence always of polystichous-flowered spikes.....5. *Guzmania*
4. Plume of the mature seed folded over: sepals strongly asymmetric: inflorescence of polystichous-flowered spikes.....6. *Catopsis*.
1. Ovary wholly inferior: fruit baccate, fleshy to coriaceous: seeds naked: leaves usually spinulose-serrate..Subfamily *Bromelioideae*.
7. Pollen grains entire, bearing neither pores nor longitudinal folds: margins of the petals free, petals connected by the filaments.....7. *Bromelia*.
7. Pollen grains variously sculptured: petals not connected by the filaments.
8. Pollen grains bearing pores: stamens usually included at anthesis: sepals mostly mucronate.
9. Petals naked.
10. Ovules few in each cell: inflorescence loosely paniculate: flowers not over 5 mm. long.....8. *Araeococcus*.
10. Ovules many in each cell.
11. Flowers in a number of very dense cone-like spikes.
9. *Hohenbergia*.[2]
11. Flowers in elongate lax spikes in an open inflorescence.
10. *Wittmackia*.
9. Petals each bearing 2 scales on the inner surface.
12. Fruits and bracts always remaining distinct.
13. Pollen grains bearing many (more than 5) pores: inflorescence compound: flowers in dense fascicles with only the petals exserted from the bracts.....11. *Gravisia*.
13. Pollen grains bearing either 2 or 4 pores.....12. *Aechmea*.

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[1] See artificial key on page 159 for the identification of specimens without good flowers.

[2] Without good flowers *Hohenbergia oligosphaera* is apt to be confused with *Gravisia aquilega*, but it may be distinguished by its floral bracts which are suborbicular to broadly ovate and abruptly contracted to an acuminate apex (Pl. I, fig. 8) instead of ovate, abruptly acute, and mucronate.

12. Fruits and bracts of the inflorescence coalescing at maturity to form a compound fruit.....13. *Ananas.*
8. Pollen grains bearing longitudinal folds: stamens exserted at anthesis: sepals obtuse or acute, never mucronate: flowers 6–8 cm. long.....14. *Billbergia.*

1. **PITCAIRNIA** L'Hérit.

Plants usually stemless. Leaves fasciculate, entire or spinulose-serrate, sheath small, often bulbous-thickened, blade linear to lanceolate with definite petiole, sometimes dimorphic with some blades reduced to horny spinulose-serrate spines. Inflorescence simple or compound, racemose. Sepals free, acute but never mucronate. Petals free, usually zygomorphic, naked or with a single triangular scale at base. Stamens equaling or shorter than the petals, anthers linear, versatile. Ovary usually superior for most of its length, style filiform, equaling the petals. Ovules many. Capsule septicidal or rarely indehiscent. Seeds appendaged at either end or rarely with a dorsal wing.—Sert. Angl. 7, t. 11 (1788).

About 170 species. Terrestrial or saxicolous, rarely epiphytic. Mexico, Central America, the Antilles and South America south to northern Argentina.

1. **P. integrifolia** Ker-Gawl. Half a meter high: leaves all alike, 7 dm. long, 13–18 mm. broad, white-lepidote beneath, strongly constricted between the sheath and the blade, the outermost ones slightly serrulate near the base: scape slender, straight, its bracts triangular, with long filiform tips: inflorescence laxly bipinnate, pyramidal, sparingly furfuraceous-lepidote to glabrous: floral bracts lanceolate, acute, mostly shorter than the slender flower-pedicels: flowers 35–40 mm. long; sepals narrowly triangular, acuminate, 10–12 mm. long; petals yellow at base and bearing a scale, the remainder bright red; ovary about 2/3 superior: capsule broadly fusiform.—Ker-Gawl. in Bot. Mag. xxxvi. t. 1462 (1812).

TRINIDAD: Botanic Gardens, St. Ann's, 1930, *Broadway 7434* (G); Fort George Hill, Cocorite, 1903, *J. R. Johnston 109* (G); cliff, Carenage, *Britton & Hazen 233* (G, NY); coastal rocks, Chaguaramas, 1921, *N. L. Britton 2715* (NY); Hort. Trin., 1890, *Herb. Trin. 4362* (Trin); Monos Island, 1917, *R. O. Williams* (Trin); Tetron Bay, 1927, *Broadway 6776* (Mo); 1928, *Broadway 6887* (Mo).

[Endemic? The source of the type is obscure; the only definite records are from Trinidad.]

2. **GLOMEROPITCAIRNIA** Mez.

Large stemless herbs, with rosulate, linear, entire leaves. Scape elongate, erect. Inflorescence of sessile or short-stipitate heads or

short spikes, bipinnate or tripinnate. Flowers perfect. Sepals free, subsymmetrical. Petals free, bearing one or two scales at base. Stamens included. Ovary about half inferior. Capsule imperfectly dehiscent. Seeds with pappiform coma at both ends.—Bull. Herb. Boiss. ser. 2, v. 232 (1905).

Two species. Lesser Antilles, Trinidad, Island of Margarita (to Venezuela).

1. **G. erectiflora** Mez. Plant 1–2 m. high: leaves many, 7 dm. long, 8 cm. broad, acute but soon rounded by withering: scape stout, much exceeding the leaves: inflorescence bipinnate with erect or ascending spikes, interrupted-thyrsoid, red, glabrous; primary bracts suberect, coriaceous, elliptic, rounded-apiculate, shorter than the axillary spikes: spikes erect or nearly so, subovoid, the lower short-stipitate; floral bracts elliptic, rounded, mucronate, ecarinate, shorter than the sepals: flowers sessile, erect; sepals sublanceolate, carinate, 21–28 mm. long.—Bull. Herb. Boiss. ser. 2, v. 233 (1905); L. B. Smith in Contrib. Gray Herb. xcv. 42, t. x, figs. 6–7 (1931). Pl. II, figs. 11–12.

TRINIDAD: Mt. Tucuche, summit, 1893, *Broadway 5250* (Trin, G, NY); 1925, *Broadway 5660* (FM); 1929, *Broadway 5660, 7129* (K); 1931, *Broadway 7461* (G).
[Island of Margarita.]

Epiphytic.

3. **TILLANDSIA** L.

Caulescent or acaulescent herbs, habit very variable. Leaves rosulate or fasciculate or evenly distributed along a stem, polystichous or distichous, entire, usually subtriangular or ligulate. Scape usually distinct. Inflorescence various, usually of distichous spikes, if spikes polystichous then single, rarely reduced to a single flower. Flowers perfect. Sepals usually symmetric, free, or equally or posteriorly joined. Petals free, naked. Stamens of various lengths relative to the petals and to the pistil. Ovary superior, glabrous. Ovules usually many and caudate. Capsule septicidal. Seeds erect, narrowly cylindric or fusiform, coma white, straight.—Sp. Pl. 286 (1753).

About 350 species. Tropical and subtropical America, from the southern United States, Mexico and the Antilles, to central Argentina and Chile.

KEY TO SPECIES.

1. Stamens exserted, longer than the petals.....§ *Platystachys*.
2. Floral bracts remote, equaling or shorter than the internodes: spikes elongate.

3. Flowers and bracts erect, appressed to the rhachis....1. *T. utriculata.*
3. Flowers and bracts spreading.....2. *T. flexuosa.*
2. Floral bracts usually more or less imbricate, always distinctly longer than the internodes: spikes not elongate.
4. Leaves fasciculate with filiform blades: inflorescence of several spikes crowded into a dense head or reduced to a single polystichous-flowered spike.....3. *T. juncea.*
4. Leaves rosulate: inflorescence of distinct spikes or of a single distichous-flowered spike.
5. Floral bracts densely imbricate, wholly concealing the rhachis, glabrous or nearly so.....4. *T. fasciculata.*
5. Floral bracts rather lax, concealing the rhachis little or not at all.
6. Floral bracts equaling or exceeding the sepals.
7. Floral bracts subglabrous: leaf-sheaths scarcely or not at all inflated.....5. *T. canescens.*
7. Floral bracts densely lepidote: leaf-sheaths strongly inflated.....6. *T. bulbosa.*
6. Floral bracts distinctly shorter than the sepals, very lax. 7. *T. subulifera.*

1. Stamens included, shorter than the petals.
8. Sepals strongly asymmetric, oblong or obovate, free. § *Pseudo-Catopsis.*
9. Inflorescence bipinnate, spikes 8 cm. long or more: floral bracts 7 mm. long.....8. *T. triticea.*
9. Inflorescence tripinnate or if bipinnate the spikes not over 6 cm. long: floral bracts scarcely over 4 mm. long. 9. *T. micrantha.*
8. Sepals symmetric, ovate or lanceolate.
10. Style elongate, equaling or exceeding the stamens: inflorescence always of distichous spikes.....§ *Allardtia.*
11. Plants 1–2 m. high: inflorescence of many pinnately arranged spikes.
12. Plant slender: spikes linear in outline, 12 mm. wide. 10. *T. subimbricata.*
12. Plant stout, often 2 m. high: spikes lanceolate in outline, 50 mm. wide.....11. *T. rubra.*
11. Plants much smaller: inflorescence simple or of digitately arranged spikes.
13. Inflorescence single, terminal, digitate.....12. *T. didistichoides.*
13. Inflorescences several, each a single spike on a long slender scape arising from the axil of a rosette-leaf.....13. *T. complanata.*
10. Style shorter than the stamens or else the inflorescence simple and polystichous.
14. Stamens emerging from the throat of the corolla: filaments transversely plicate.....§ *Anoplophytum.*
15. Inflorescence simple and polystichous.
16. Sepals equally subfree.....14. *T. stricta.*
16. Sepals much connate posteriorly.....15. *T. pulchella.*
15. Inflorescence digitate-compound: spikes distichous-flowered.....16. *T. Gardneri.*
14. Stamens deeply included.
17. Petal-blades broad and conspicuous, large.....§ *Phytarrhiza.*
18. Spike lax: floral bracts spreading, not at all imbricate. 17. *T. monadelpha.*

18. Spikes dense: floral bracts imbricate and concealing the rhachis.
19. Floral bracts green or light rose, drying light: petal-blades elliptic.....18. *T. anceps.*
19. Floral bracts deep rose, drying dark: petal-blades large, suborbicular.....19. *T. Morreniana.*
17. Petal-blades narrow, small: leaves subulate, distichous. § *Diaphoranthema.* 20. *T. usneoides.*

ARTIFICIAL KEY TO THE SPECIES OF TILLANDSIA AND VRIESIA FOR THE IDENTIFICATION OF MATERIAL WITHOUT GOOD FLOWERS.

1. Spikes with flowers distichous or secund, or else the inflorescence reduced to a single flower.
2. Sepals asymmetric, oblong or obovate, free, not over 10 mm. long.
3. Inflorescence bipinnate, spikes 8 cm. long or more: floral bracts 7 mm. long.....8. *T. triticea.*
3. Inflorescence tripinnate or if bipinnate the spikes not over 6 cm. long: floral bracts scarcely over 4 mm. long. 9. *T. micrantha.*
2. Sepals symmetric, ovate or lanceolate.
4. Flowers strongly secund.
5. Inflorescence simple, few-flowered: floral bracts broadly acute, shorter than the sepals.....6. *V. Broadwayi.*
5. Inflorescence usually compound: floral bracts acuminate, longer than the sepals.....9. *V. paniculata.*
4. Flowers not at all secund.
6. Plant moss-like: inflorescence reduced to a single flower which soon becomes pseudo-axillary.....20. *T. usneoides.*
6. Plant not at all moss-like: inflorescence several- to many-flowered.
7. Flowers spreading at anthesis and after.
8. Inflorescence pendulous, simple: floral bracts shorter than the sepals.....3. *V. simplex.*
8. Inflorescence erect.
9. Leaf-blades lorate: plants 1 m. or more high: scape-bracts foliaceous.
10. Inflorescence simple, many-flowered: rhachis very stout.....5. *V. macrostachya.*
10. Inflorescence compound: rhachis slender....8. *V. procera.*
9. Leaf-blades narrowly triangular: upper scape-bracts not at all foliaceous.
11. Floral bracts equaling or shorter than the internodes: inflorescence usually compound: sepals 22 mm. long.....2. *T. flexuosa.*
11. Floral bracts distinctly longer than the internodes: inflorescence simple: sepals 13 mm. long.....17. *T. monadelpha.*
7. Flowers spreading only in so far as they are forced to make room for those directly above them.
12. Floral bracts equaling or shorter than the internodes: inflorescence and spikes very lax...1. *T. utriculata.*
12. Floral bracts distinctly longer than the internodes.

13. Inflorescence simple or digitately compound from a few spikes.
    14. Floral bracts equaling or exceeding the sepals.
        15. Inflorescences several, each a single spike on a long slender scape arising from the axil of a rosette-leaf.....13. *T. complanata.*
    15. Inflorescence single, terminal.
        16. Leaf-blades lorate.
            17. Floral bracts up to 7 cm. long. 2. *V. longibracteata.*
            17. Floral bracts 35 mm. long....4. *V. chrysostachys.*
        16. Leaf-blades narrowly triangular to filiform.
            18. Leaf-sheaths broadly ovate, conspicuous, several times broader than the blades.
                19. Sepals much connate posteriorly.
                    20. Floral bracts subglabrous: leaf-sheaths scarcely or not at all inflated.....5. *T. canescens.*
                    20. Floral bracts densely lepidote: leaf-sheaths strongly inflated. 6. *T. bulbosa.*
                19. Sepals equally sub-free....12. *T. didistichoides.*
            18. Leaf-sheaths inconspicuous, rarely more than twice as broad as the blades.
                21. Spikes crowded into a dense head.
                    22. Leaf-blades filiform: leaves ferruginous at base.....3. *T. juncea.*
                    22. Leaf-blades narrowly triangular: leaves cinereous throughout. 16. *T. Gardneri.*
                21. Spikes distinct or only a single spike.
                    23. Posterior sepals much connate: upper scape-bracts filiform-caudate: leaf-sheaths evenly ferruginous.....4. *T. fasciculata.*
                    23. Posterior sepals free: upper scape-bracts acute: leaf-sheaths longitudinally red and green striped.
                        24. Floral bracts green or light rose, drying light.....18. *T. anceps.*
                        24. Floral bracts deep rose, drying dark.....19. *T. Morreniana.*
    14. Floral bracts distinctly shorter than the sepals, very lax.....7. *T. subulifera.*
13. Inflorescence amply paniculate from a number of pinnately arranged spikes.
    25. Spikes 12 mm. wide, narrowly linear: leaf-blades narrowly triangular.....10. *T. subimbricata.*
    25. Spikes much broader: leaf-blades lorate.
        26. Floral bracts twice as long as the sepals. 1. *V. stenostachya.*
        26. Floral bracts but slightly exceeding the sepals.
            27. Spikes narrowly oblong, suberect....7. *V. albiflora.*
            27. Spikes lanceolate, spreading or reflexed. 11. *T. rubra.*

1. Spike polystichous-flowered: inflorescence simple.
28. Floral bracts coriaceous.....3. *T. juncea.*
28. Floral bracts membranaceous.
29. Sepals equally sub-free.....14. *T. stricta.*
29. Sepals much connate posteriorly.....15. *T. pulchella.*

1. **T. utriculata** L. One to two meters high: leaves densely rosulate, minutely punctulate-lepidote; sheaths large, ovate; blades narrowly triangular, subulate-acuminate, 50 mm. broad at base: scape erect, its bracts ovate, caudate to obtuse, rather remote: inflorescence lax, amply paniculate or rarely simple; primary bracts small, resembling the upper scape-bracts; spikes laxly 6–14-flowered, elongate, ascending, bearing several sterile bracts at base; floral bracts remote, ovate, acute or obtuse, glabrous, nerved, much shorter than the sepals: flowers erect, up to 40 mm. long; sepals equally subfree, obtuse, 18 mm. long, glabrous, nerved, ecarinate; petals white, tubular, erect, much exceeding the sepals; stamens and style slender, much exceeding the petals: capsule 35 mm. long, erect.—Sp. Pl. 286 (1753).

TRINIDAD: Tabaquite, near El Paraiso, 1917, *Broadway 8950* (Trin); Hort. Trin., 1890, *Broadway 4407* (Trin); St. Ann's on tall Saman trees, 1923, *Broadway 5165* (FM, Mo); Arima, 1906, *Dannouse* (Trin); Chaguanas, 1844, *Herb. Trin. 1750 in part* (Trin); indefinite, *Broadway 2380, 2631b, Fendler 815* (Mez!); *Herb. Trin. 2010* (Trin); 1921, *L. H. & E. Z. Bailey* (NY). TOBAGO: Government House grounds, 1910, *Broadway 3400* (FM, Mo), *3640* (FM, NY); indefinite, *Broadway 3056* (Mez!).
[Florida, Mexico, Antilles, Venezuela.]

Epiphytic.

2. **T. flexuosa** Sw. (Cf. p. 148). Stemless, 1 m. high or often less: leaves densely rosulate, 4–5 dm. long, sheaths large, ovate, forming an ellipsoid pseudo-bulb, blade narrowly triangular, 25 mm. broad, often transversely banded: scape slender, erect, glabrous, its bracts elliptic: inflorescence simple or laxly bipinnate: primary bracts lanceolate, small: spikes lax; rhachis slender, flexuous, strongly flattened opposite the flowers; floral bracts elliptic-acute, nerved, shorter than the sepals: flowers remote, spreading, short-stipitate, 45–55 mm. long, white, rose, or purple; sepals free, obtuse, 22 mm. long; stamens and style exserted: capsule slenderly cylindric, 5–9 cm. long.—Prodr. 56 (1788). *T. aloifolia* Hook. Exot. Fl. iii. t. 205 (1827).

TRINIDAD: San Fernando, 1873, *Herb. Trin. 2011* (Trin); Gasparee, 1861, *Herb. Trin. 846* (Trin); Lapeyrouse Cemetery, Port of Spain, 1930, *Broadway* (G); San Juan, 1927, *Broadway 6782* (S); Chacachacare, 1921, *Broadway 10571* (Trin); Hort. Trin., 1888, *Broadway 2423* (Trin); same, 1890, *Broadway 4406* (Trin); Erin, 1915, *Broadway 7337* (Trin); L'Islet, near Chatham, 1916, *Broadway 8649* (Trin); Icacos, near St. Quinton, 1915, *Broadway 7372* (Trin); Patos, 1921, *Broadway* (Trin); the Savannah, Port of Spain, 1906, *Hart*

(Trin); indefinite, *Herb. Trin. 609* (Trin); 1919, *Broadway* (Trin, G, NY); 1915, *Broadway* (NY); *De Schach* (Mez!); *Broadway 2805, 3232* (Mez!). TOBAGO: Calder Hall road on hedge shrubs, 1914, *Broadway 4746* (G, Mo); indefinite, *Eggers 5667* (Mez!); *Broadway 4804* (Mez!).

[Florida, the Antilles, Central America, Colombia, Venezuela, British and Dutch Guiana.]

Epiphytic.

3. **T. juncea** (R. & P.) LeC. Stemless, up to 35 cm. high, sometimes propagating by stolons: leaves densely fasciculate, subulate; sheaths triangular, ferruginous-tomentose-lepidote; blades erect, filiform, channelled: scape erect, its bracts ovate, long-caudate, densely imbricate: inflorescence short, compact, of a few densely massed distichous spikes, or sometimes reduced to a single polystichous spike; primary bracts like the scape-bracts, mostly shorter than the axillary spikes: spikes erect, sessile, lanceolate in outline, stout; floral bracts ovate, densely imbricate, carinate, even, lepidote, exceeding the sepals, coriaceous: flowers erect, 40 mm. long; sepals lanceolate, glabrous, even, about 21 mm. long, posterior ones connate for 1/3 their length; petals tubular-erect, violet; stamens and style exserted: capsule 30 mm. long, cylindric.—LeC. in Ann. Lyc. Nat. Hist. N. Y. ii. 130 (1828). *Bonapartea juncea* R. & P., Fl. Peruv. iii. 38, t. 262 (1802).

TRINIDAD: Queen's Park Savannah, Port of Spain, 1931, *Broadway* (G); Caura, Valley of Tumbasson, 1928, *F. C. Buthn 11976* (Trin); St. Ann's, 1894, *Broadway 5501* (Trin); Arima, 1906, *Dannouse* (Trin, NY); indefinite, *Fendler 825, Broadway 2824* (Mez!).

[Antilles and Mexico to Venezuela and Peru.]

Epiphytic.

4. **T. fasciculata** Sw. Very variable, the Trinidad specimens belonging to the typical form: leaves rosulate, 2–6 dm. long, densely and minutely pale-appressed-lepidote; sheaths ovate, castaneous; blades narrowly triangular, acuminate, involute: scape stout, erect, its bracts leaf-like, densely imbricate: inflorescence (in the Trinidad specimens) of 1–5 large subsessile spikes digitately arranged; primary bracts like the upper scape bracts: spikes lanceolate in outline, thick, somewhat compressed; floral bracts ovate, acute, 35–50 mm. long, exceeding the sepals, glabrous or nearly so, carinate at apex, densely imbricate: flowers erect, subsessile; sepals lanceolate, mucronate-acute, glabrous, 27 mm. long, carinate, much joined posteriorly; petals violet, tubular-erect; stamens and style exserted.—Prodr. 56 (1788).

TRINIDAD: St. Ann's, 1907, *Broadway 2653* (FM); 1923, *5166* (FM, Mo); Quare River forests, 1931, *Broadway* (G); near no. 6 bridge, Cumuto Road, Cumuto, 1931, *Broadway 7716* (G); Tabaquite, 1918, *Broadway* (NY); Arima,

1902 and 1906, *Dannouse* (Trin); the Savannah, Port of Spain, 1906, *A. Fredholm* (Trin); San Fernando, 1873, *Herb. Trin. 2006* (Trin); indefinite, *Broadway 3234* (Mez!). TOBAGO: Mason Hall River, 1913, *Broadway* (NY); Adelphi, 1913, *Broadway* (G); indefinite, *Broadway 4285* (Mez!).
[Florida, the Antilles and Mexico to Dutch Guiana and Colombia.]

Epiphytic, saxicolous, or terrestrial.

5. **T. canescens** Sw. Stemless, about 2 dm. high: leaves utriculate-rosulate, equaling or exceeding the inflorescence, densely appressed-lepidote; sheaths conspicuous, broadly ovate, castaneous; blades narrowly triangular, involute-subulate, cinereous: scape erect or ascending, its bracts broadly ovate, inflated, long-caudate: inflorescence of a few digitately arranged spikes; primary bracts like the upper scape-bracts, shorter than the spikes: spikes lanceolate in outline, compressed, few-flowered; floral bracts ovate, strongly carinate, glabrous, strongly nerved, reddish, equaling or exceeding the sepals: flowers erect; sepals much connate posteriorly, 14–17 mm. long, elliptic, carinate, glabrous, even; petals violet, twice as long as the sepals; stamens and style exserted: capsule 28 mm. long, cylindric.—Sw. Prodr. 57 (1788).

TRINIDAD: indefinite, *De Schach* (Baker!).
[Antilles.]

Epiphytic.

6. **T. bulbosa** Hook. Stemless, 3 dm. high or usually much less: leaves inflated, bulbous-rosulate at base, blade involute-subulate: scape erect, its bracts elliptic with long blades exceeding the inflorescence: inflorescence simple or digitate from a few spikes: spikes lanceolate, densely 5–8-flowered, compressed, 5 cm. long; floral bracts ovate-acute, 15 mm. long, exceeding the sepals, densely lepidote, coriaceous: flowers erect, 3 cm. long, sessile; sepals glabrous, joined posteriorly; petals violet; stamens and style exserted: capsule cylindric, 4 cm. long.—Exot. Fl. iii. t. 173 (1827).

TRINIDAD: Tabaquite, 1918, *Broadway* (G, NY); Tamana, 1915, *Broadway 7895* (Trin); Moruga, Edward Trace, 1916, *Broadway 8205* (Trin); Quare River forests, 1931, *Broadway* (G); indefinite, *Fendler 823, 824* (Mez!); *Broadway 2196, 3237* (Mez!). TOBAGO: indefinite, *Eggers 5570* (Mez!); *Broadway 4287* (NY).
[Mexico and the Antilles to Colombia and eastern Brazil.]

Epiphytic.

7. **T. subulifera** Mez. Stemless, 15 cm. high: leaves few in an elongate pseudo-bulb, concolorous, 13 cm. long; blades linear, 5 mm. wide, angular-folded, subulate, erect, rigid, appressed-canescent-lepidote: scape erect, its bracts coriaceous, appressed-lepidote, the

upper ones not at all caudate: inflorescence erect, simple, distichous, 4-flowered, about equaling the leaves, 50 mm. long; axis slender, geniculate; floral bracts thickly coriaceous, strongly nerved, carinate, incurved, 20 mm. long, shorter than the sepals, densely appressed-canescent-lepidote: flowers erect or nearly so, 32 mm. long, yellow or white in the dried specimen; sepals 22 mm. long, narrowly obtuse, free, coriaceous, lepidote like the bracts; petals tubular-erect, stamens and style exserted: capsule 6 cm. long.—Mez in Fedde Rep. Spec. Nov. xvi. 74 (1919).

TRINIDAD: by Longdenville, *Broadway 4200* (B, TYPE).

8. **T. triticea** Burch. Stemless, 4–7 dm. high: leaves 3 dm. long, densely and minutely appressed-lepidote, usually dark-spotted, 3 cm. broad above the broadly ovate dark brown sheath, abruptly acute, apiculate: scape erect, glabrous, its bracts narrowly ovate, acute, exceeding the internodes: inflorescence distichous, laxly bipinnate, glabrous, 2–3 dm. long; primary bracts lanceolate, much shorter than the spikes: spikes linear, 20–30-flowered, 8 cm. long or more, spreading, rhachis slender, flexuous; floral bracts broadly ovate, acute, 7 mm. long, equaling the sepals, not imbricate, glabrous, even: flowers sessile, suberect; sepals obovate, asymmetric; petals yellowish; stamens included: capsule narrowly cylindric.—Burch. in Journ. Bot. xxvi. 42 (1888).

TRINIDAD: Mt. Tucuche, 1920, *Britton, Coker & Rowland 1323 in part* (NY).

[British Guiana, Brazil, Bolivia, Peru.]

Epiphytic.

9. **T. micrantha** Bak. Stemless, 4 dm. high; leaves 3–4 dm. long; sheaths large, elliptic, brown; blade lingulate, rounded-apiculate, 3–4 cm. broad, often irregularly purple-spotted: scape slender, erect or ascending, its bracts ovate-lanceolate, acuminate to rounded-apiculate, shorter than or equaling the internodes: inflorescence lax, tripinnate or bipinnate with the primary branches not over 6 cm. long; axis flexuous; primary bracts like the upper scape-bracts: spikes laxly 10–25-flowered, 5–10 mm. broad; floral bracts ovate-acute, convex, ecarinate, 4–5 mm. long, about equaling the sepals, not imbricate, sparsely punctulate-lepidote: flowers suberect, sessile, 2–4 mm. apart, not touching at maturity, much exceeding the internodes; sepals obovate, sparsely punctulate-lepidote or glabrous, even; petals white, slightly exceeding the sepals; stamens deeply included, exceeding the pistil, anthers ovoid, mucronate.—Bak. in Journ. Bot. xxv. 303 (1887),

not *T. micrantha* Bak. Bull. Torr. Bot. Club, xxix. 698 (1902), published as a new species in spite of the previous use of the name for a perfectly valid species; L. B. Smith in Contrib. Gray Herb. xcv. 45, t. ix, figs. 5–9 (1931).

TRINIDAD: Mt. Tucuche, 1920, *Britton, Coker & Rowland 1323 in part* (G); 1922, *Freeman & Williams 10088* (Trin); Heights of Aripo, 1922, *Broadway 9912* (Trin, NY); Mt. Tamana, 1925, *Broadway* (FM); indefinite, 1877–80. *Fendler 818* (K, TYPE; phot. G).
[Venezuela.]

Epiphytic.

10. **T. subimbricata** Bak. Stemless, 1 m. high: leaves up to 8 dm. long, 40 mm. wide above the broadly ovate sheath, densely punctulate-lepidote; blade narrowly triangular, subulate-acuminate: scape stout, erect, its bracts triangular-elliptic, long-caudate, imbricate: inflorescence laxly tripinnate, ample; primary bracts like the upper scape-bracts, much shorter than the axillary branches; branches of the inflorescence curved-ascending: spikes up to 20-flowered, 15 cm. long, 12 mm. wide; floral bracts narrowly ovate, inrolled at apex, 18–20 mm. long, glabrous, strongly nerved, exceeding the sepals: flowers erect or nearly so; sepals equally sub-free, narrowly elliptic, obtuse, 11–13 mm. long, glabrous, strongly nerved; petals blue or lilac, 25 mm. long; stamens included, equaling the style.—Bak. in Journ. Bot. xxv. 304 (1887); L. B. Smith in Contrib. Gray Herb. lxxxix. 15, t. iv, fig. 1 (1930). *T. orthorhachis* Mez & C. F. Bak. in Bull. Torr. Bot. Club, xxx. 435 (1903).

TRINIDAD: Marabella, 1868, *Herb. Trin. 2007* (Trin); woods near Wellington Estate, 1867, *Herb. Trin. 773* (Trin); Moruga, 1916, *Broadway 7600* (Trin, NY); Caroni Reclamation Lands, 1923, *Broadway 10231* (Trin, NY); St. Ann's, 1931, *Broadway* (G); indefinite, *Herb. Trin. 2005* (Trin, US, phot. G); *Fendler 816* (K, TYPE; BM).
[Jamaica, Cuba, Nicaragua, Panama, Colombia.]

Epiphytic.

11. **T. rubra** R. & P. Stemless, often 2 m. high: leaves densely rosulate; sheaths subovate, inconspicuous; blade linear, up to 8 cm. broad, triangular-acute: scape stout, erect, its bracts leaf-like, imbricate: inflorescence amply paniculate; primary bracts like the upper scape-bracts, much shorter than the axillary spikes: spikes lanceolate, acute, complanate, densely 6–28-flowered, 18–30 cm. long, 4–5 cm. wide, spreading or recurved, more or less stipitate with sterile bracts at base; floral bracts narrowly obovate, keeled at apex, glabrous, even, about equalling the sepals: flowers erect, short-stipitate, sepals equally sub-free, 35–45 mm. long, oblong-lanceolate, carinate; petals

5–6 cm. long, slightly exceeding the stamens.—Fl. Peruv. iii. 40, t. 266 (1802). *Tillandsia paniculata* Ch. & Schdl. in Linnaea, vi. 54 (1831), not L. (1762).

TRINIDAD: Morne Bleu, 1922, *Freeman 10570* (Trin); Maracas road to the waterfall, 1924, *Broadway 5363* (FM, Mo, K); Maracas, on the face of the waterfall, 1924, *Broadway 5366 in part* (Mo); Blanchisseuse road, St. Patrick Estate, 1930, *Broadway 7462* (G, S); Ortinola Estate, Maracas, 1931, *Broadway 7459* (G).
[Mexico and the Antilles to Venezuela, Peru and Bolivia.]

Epiphytic.

12. **T. didistichoides** Mez. Stemless, about 2 dm. high: leaves densely bulbose-rosulate, densely appressed-lepidote; sheaths broadly ovate, conspicuous, deep castaneous; blades narrowly triangular, involute-subulate: scape slender, decurved, its bracts broadly ovate, imbricate, inflated, caudate: inflorescence bipinnate; primary bracts like the upper scape-bracts, much shorter than the spikes, erect, concealing the main axis of the inflorescence: spikes rather densely 8–10-flowered, linear-lanceolate in outline, strongly compressed, 4–5 cm. long, 10–15 mm. wide, long-stipitate with several sterile bracts at base; floral bracts elliptic, acute, 15 mm. long, much exceeding the sepals, carinate, strongly nerved, obscurely lepidote, bright pink: flowers erect, 20 mm. long; sepals free, 10 mm. long, elliptic, acute, glabrous, strongly nerved; petals lilac; stamens slightly shorter than the petals.—Mez in DC. Mon. Phan. ix. 778 (1896). Pl. II, figs. 1–3.

TRINIDAD: indefinite, *Fendler 827* (BM, TYPE; K, phot. G); Saut d'Eau, north coast, 1930, *Broadway 7433* (G); Las Lapas road off the Blanchisseuse road, 1931, *Broadway 7457* (G, sterile specimen); Mt. Tucuche, near 12-mile post, 1931, *Broadway 7458* (G).
[Venezuela.]

Epiphytic.

13. **T. complanata** Benth. Stemless: leaves rosulate, minutely appressed-lepidote, often exceeding the inflorescences, 3–4 dm. long, 4–5 cm. broad above the broadly ovate sheath, often purple-tinged, ligulate, apex broadly acute to rounded-apiculate, scapes several to many from a single leaf-rosette, slender, each bearing a single spike; scape-bracts narrowly elliptic, acute or apiculate, mostly exceeding the internodes: spikes slender, 6–24-flowered, 4–8 cm. long, 15 mm. broad; floral bracts imbricate, elliptic, obtuse, ecarinate, 15 mm. long, even or finely striate-nerved, exceeding the sepals; flowers sessile, 22 mm. long; sepals much joined posteriorly, glabrous, nerved; petals blue or violet; stamens and style included: capsule cylindric, 4 cm. long.—Bot. Sulph. 173 (1845).

TRINIDAD: Heights of Aripo, 1922, *Broadway 10568* (Trin, K); Quare road via Valencia, near the reservoir, 1927, *Broadway 6780* (K); Las Lapas road off the Blanchisseuse road, 1931, *Broadway 7456* (G).
[Antilles, British Guiana, Venezuela, Colombia, Ecuador, Peru, Bolivia.]

Epiphytic.

14. **T. stricta** Soland. Stemless or short-stemmed, 2 dm. or less high: leaves densely rosulate, 14 cm. long, the outer ones strongly recurved, sheath small, membranaceous, blade narrowly triangular, 8 mm. broad, filiform-acuminate, densely appressed-lepidote: scape slender, glabrous, its bracts ovate, long-caudate, membranaceous, imbricate: inflorescence simple, polystichous, short-cylindric, 35 mm. wide; floral bracts broadly ovate, exceeding the sepals, glabrous or lepidote toward apex, inflated, nerved, roseate, the lower ones long-caudate: flowers suberect, 2 cm. long, sessile; sepals lance-oblong, compressed, keeled, nerved, equally short-connate; petals blue changing to red, exceeding the pistil; stamens shorter than the pistil: capsule cylindric, 38 mm. long.—Soland. in Bot. Mag. xxxvii. t. 1529 (1813).

TRINIDAD: Caroni Reclamation Lands, 1923, *Broadway 10232* (Trin, NY).
[Venezuela, British and Dutch Guiana, Brazil.]

Epiphytic.

15. **T. pulchella** Hook. Plant usually caulescent, often branching, rather variable: leaves densely polystichous-ranked, narrowly triangular, subulate-acuminate, channelled, densely and minutely appressed-lepidote, 4–7 mm. wide above the inconspicuous sheath: scape slender, short, largely concealed by the leaves, its bracts membranaceous, elliptic, caudate, rose: inflorescence of a single short 4–14-flowered polystichous spike; floral bracts like the scape-bracts but less caudate, much exceeding the sepals, punctulate-lepidote, strongly nerved: flowers erect; sepals almost completely connate posteriorly, lanceolate, acute, 10 mm. long; petals blue or white, 20 mm. long, broadly obtuse; stamens included, shorter than the style: capsule cylindric, 15 mm. long.—Hook. Exot. Fl. iii. t. 154 (1827).

TRINIDAD: indefinite, *De Schach* (Baker!).
[Antilles, Venezuela, Guiana, Brazil, Bolivia, Argentina.]

Epiphytic, often in large masses. Originally described from Trinidad.

16. **T. Gardneri** Lindl. Stemless: leaves densely rosulate, narrowly triangular, 20 cm. long, cinerous, densely tomentose-lepidote: inflorescence of a few short densely massed spikes: spikes ovate, acute, 4–6-flowered; floral bracts ovate, acute, 14 mm. long, exceeding the

sepals, carinate, densely lepidote: flowers erect, 15 mm. long, sessile; sepals ovate, acute, 10 mm. long, coriaceous, even; petals rose; stamens included, equaling or exceeding the style: capsule cylindric, 37 mm. long.—Lindl. in Bot. Reg. xxviii. sub t. 63 (1842).

TRINIDAD: Port of Spain, 1920, *N. L. Britton 1181* (G); Hort. Trin., 1895, *W. Lunt 5999* (Trin); Valley of Tumbasson, Caura, 1928, *F. C. Buthn 11978* (Trin); St. Ann's, 1916, *Broadway 8168* (Trin); small savannah near Government House kitchen garden, 1907, *Broadway* (Trin); indefinite, *Fendler 822* (Baker!), *Broadway 2631* (Mez!).
[Venezuela, Brazil.]

Epiphytic or saxicolous.

17. **T. monadelpha** (Morr.) Bak. Stemless, 35 cm. high: leaves densely rosulate, 2 dm. long, obscurely punctulate-lepidote; sheath ovate; blade very narrowly triangular, 10–15 mm. broad: scape erect, slender, glabrous, its bracts elliptic-lanceolate, lepidote at apex, imbricate: inflorescence simple, distichous, oblong-linear, about 22-flowered, appearing lax by the spreading of the flowers, 13 cm. long; rhachis straight, angled, thickened at base of each flower; floral bracts ovate-acute, spreading, 17 mm. long, equaling the sepals, keeled, nerved, sparsely lepidote, soon glabrous: flowers sessile, spreading, 30 mm. long; sepals equally short-connate, glabrous, keeled; petals white, blade ovate, reflexed; stamens deeply included, exceeding the style, filaments connate: capsule narrowly cylindric, 4–7 cm. long.—Bak. in Journ. Bot. xxv. 281 (1887). *Phytarrhiza monadelpha* Morr. in Belg. Hort. xxxii. 168, t. 7 (1882). *Tillandsia graminifolia* Bak. in Journ. Bot. xxv. 281 (1887). *T. monobotrya* Mez in Fedde Rep. Spec. Nov. xvi. 77 (1919).

TRINIDAD: Chaguanas, 1868, *Finlay 2004* (Trin, NY); 1889, *Broadway 3741* (Trin); Arima, 1906, *Dannouse* (Trin); Tamana forests, 1915, *Broadway 7808, 7818* (Trin); vicinity of Tabaquite, 1921, *N. L. Britton, Freeman & Nowell 2574* (NY); indefinite, *Fendler 828* (Baker!); *Broadway 2807* (Mez!).
[Guiana, Central America, Colombia, Ecuador.]

Epiphytic.

18. **T. anceps** Lodd. Stemless, 3 dm. high: leaves rosulate, 15–20 cm. long, minutely punctulate-lepidote; sheaths triangular-ovate, longitudinally red-striate; blades narrowly triangular, acuminate, 7 mm. broad: scape stout, erect, short and largely concealed by the leaves, its bracts broadly ovate, acute or acuminate, glabrous, even, densely imbricate, gradually passing into the floral bracts: inflorescence of a single stout compressed densely distichous spike, 10–20-flowered, up to 16 cm. long, 55 mm. wide; floral bracts triangular-acute,

up to 40 mm. long, much exceeding the sepals, strongly carinate, glabrous, even, pale rose with greenish margins: flowers erect, short-stipitate; sepals equally sub-free, 30 mm. long, lanceolate, acute, carinate toward apex; petals more than twice as long as the sepals, claw linear, white, blade lance-elliptic, acute, blue, spreading; stamens deeply included, exceeding the style.—Lodd. Bot. Cab. viii. t. 771 (1823). *T. lincatifolia* Mez in DC. Mon. ix. 686 (1896).

TRINIDAD: Tamana forests, 1915, *Broadway 7809* (Trin); Mt. Tamana, 1925, *Broadway* (FM).
[Honduras, Costa Rica, Panama, Venezuela, British Guiana.]

Epiphytic. Originally collected in Trinidad by Adam. Introduced in European cultivation by Loddiges.

19. **T. Morreniana** Regel. Habit almost identical with that of *T. anceps* and rather difficult to distinguish from it without good flowers: inflorescence rather more dense than in *T. anceps* and the floral bracts deep rose drying to a blackish brown: petals with suborbicular blade, blue, up to 60 mm. long.—Regel in Gartenfl. xix. 41 (1870). *T. Lindeni* Morr. in Belg. Hort. xix. 321, t. 18 (1869); not *T. Lindeniana* Regel in Gartenfl. xviii. 193 (1869).

TRINIDAD: Hort. Trin., *Herb. Trin. 4392* (Trin).
[Peru.]

Introduced in cultivation.

20. **T. usneoides** L. Long-filiform-caulescent, flexuous, often densely massed, gray to somewhat ferruginous, densely tomentose-lepidote throughout: leaves distichous; sheath elliptic; blade linear, less than 1 mm. broad, recurving: flowers solitary, soon becoming axillary by the elongation of the stem, short-pedicelled, yellowish green or blue, 10–12 mm. long; sepals narrowly ovate, equally connate at base, 7 mm. long; petals small, blade narrow, recurved; stamens deeply included, exceeding the style: capsule narrowly cylindric, abruptly short-beaked.—Sp. Pl. ed. 2. 411 (1762).

TRINIDAD: indefinite, *Herb. Trin. 822* (Trin); *Fendler 813* (Mez!).
TOBAGO: indefinite, *Broadway 2492* (Mez!).
[Southern United States to central Argentina and Chile.]

Epiphytic.

Species of Uncertain Position.

T. compressa Bert. So far all Trinidad specimens labelled as this species, on examination, have proved to be *T. fasciculata*.

4. **VRIESIA** Lindl.

Large showy herbs. Leaves densely rosulate, often banded or mottled, entire. Inflorescence various, spikes usually distichous-flowered. Floral bracts conspicuous, enfolding or concealing the bases of the flowers. Flowers with short stout pedicels, fugacious. Sepals free. Petals free, ligulate, scales usually two on the inside of each petal and entire. Ovary nearly or quite superior, style elongate. Ovules many, usually caudate. Seeds fusiform, with a long coma.—Lindl. in Bot. Reg. xxix. t. 10 (1843).

About 100 species. Epiphytic, rarely terrestrial. Chiefly Brazilian with outlying species from Mexico and the Antilles to Argentina.

KEY TO SPECIES.[1]

1. Petals not flaccid, erect or nearly so.....Subgenus *Euvriesia*.
2. Stamens exserted at anthesis.....§ *Genuinae*.
3. Inflorescence compound: spikes dense.....1. *V. stenostachya*.
3. Inflorescence simple.
4. Inflorescence erect: floral bracts imbricate, much exceeding the sepals.....2. *V. longibracteata*.
4. Inflorescence pendulous: floral bracts remote, spreading, shorter than the sepals.....3. *V. simplex*.
2. Stamens included at anthesis.....§ *Xiphion*.
5. Inflorescence simple or rarely forked.
6. Inflorescence dense: flowers not secund.....4. *V. chrysostachys*.
6. Inflorescence lax.
7. Flowers and floral bracts not at all secund: inflorescence many-flowered.....5. *V. macrostachya*.
7. Flowers and floral bracts secund: inflorescence few-flowered.....6. *V. Broadwayi*.
5. Inflorescence definitely paniculate.
8. Floral bracts erect or nearly so: spikes rather dense..7. *V. albiflora*.
8. Floral bracts spreading: spikes lax.....8. *V. procera*.
1. Petals flaccid, pendant.....Subgenus *Alcantarea*.
9. *V. paniculata*.

1. **V. stenostachya** (Bak.) Mez. Leaves 7 dm. long, 6–8 cm. wide, linear; inflorescence compound; spikes 5 dm. long, bearing many sterile bracts at base; floral bracts 55 mm. long, rose; flowers with pedicels 2–4 mm. long; sepals narrowly elliptic, obtuse, 26 mm. long; petals yellow (?).—Mez in DC. Mon. Phan. ix. 564 (1896). *Tillandsia stenostachya* Bak. in Journ. Bot. xxvi. 109 (1888).

TRINIDAD: by Maracas Falls, 1845, *Crueger* (K, TYPE); 1925, *Broadway 5560* (FM, phot. G, Mo); wet cliff at waterfall, Mt. Tucuche, 1920, *Britton, Hazen & Mendelson 1317* (NY, phot. G); *Freeman 9068* (Trin); 1924, *Broadway 5366 in part* (NY).

[Endemic.]

[1] For key to use in identifying imperfect material see p. 159.

2. **V. longibracteata** (Bak.) Mez. Stemless, 1 m. high or less: leaves 4 cm. or more broad, linear, abruptly acute, concolorous in all Trinidad material: scape erect, its bracts broadly ovate, acute or apiculate, densely imbricate: inflorescence simple, narrowly lanceolate, densely many-flowered; floral bracts up to 7 cm. long, lanceolate, acute, red at anthesis, later turning green, more or less incurved: flowers yellow, rarely known to emerge from the bracts in the Trinidad specimens (Broadway!), pedicels 7 mm. long; sepals narrowly elliptic, 25 mm. long.—Mez in DC. Mon. Phan. ix. 568 (1896), as *longebracteata*. *Tillandsia longibracteata* Bak. in Journ. Bot. xxvi. 81 (1888).

TRINIDAD: near summit of Mt. Tucuche, 1920, *N. L. Britton, Hazen & Mendelson 1363* (US, NY); Heights of Aripo, 1922, *Broadway 9913* (Trin, G, NY); *9918* (Trin, NY); Blanchisseuse road, 1925, *Broadway 5669* (FM, Mo); 1928, *Broadway* (K); Mora forest, 1927, *Broadway* (Mo); Morne Bleu, 1922, *Freeman 10569* (Trin); Valencia road, 1931, *Broadway 7584* (G); indefinite, *Fendler 830, 831* (Baker!); *Crueger* (Mez!); *Herb. Trin. 2008 in part* (Trin). TOBAGO: Mason Hall, 1913, *Broadway* (US).
[Venezuela, British Guiana.]

Epiphytic and terrestrial.

3. **V. simplex** (Vell.) Beer. Leaves rosulate, up to 5 dm. long; sheaths broadly elliptic, often with a strong purple tinge, minutely punctulate-lepidote; blades ligulate, up to 35 mm. broad, rounded-apiculate or abruptly acute: scape slender, strongly decurved, its bracts elliptic; varying from distinctly shorter than the internodes to slightly imbricate: inflorescence simple, pendulous, very lax, much exceeding the leaves if extended; rhachis slender, flexuous; floral bracts broadly ovate, 3–5 cm. long, red with yellow apex, much exceeded by the sepals: flowers remote, spreading, 4–8 cm. long, long-pedicelled; sepals oblong, yellow, 30–35 mm. long; petals yellow with green tips; stamens exserted.—Beer, Brom. 97 (1857). *Tillandsia simplex* Vell. Fl. Flum. 133 (1825), Icones, iii. t. 130 (1827). *Vriesia scalaris* Morr. in Belg. Hort. xxix. 301 (1879).

TRINIDAD: Tamana, *Herb. Trin. 1749* (Trin).
[Brazil, Venezuela, Colombia.]

Epiphytic.

4. **V. chrysostachys** Morr. Stemless, about 5 dm. high: leaves rosulate, ligulate, acuminate, concolorous, 40–48 mm. wide: scape erect, its bracts densely imbricate: inflorescence simple or of 2–3 erect spikes; spikes very narrow, 30 cm. long, 2 cm. broad; floral bracts 35 mm. long, distichous, yellow, coriaceous, exceeding the flowers, densely imbricate, slightly if at all incurved: flowers yellow,

25 mm. long, subsessile; sepals ovate-lanceolate, acute, 15 mm. long, apex cucullate-incurved; petals 24 mm. long, their scales entire, acute. —Morr. in Belg. Hort. xxxi. 87 (1881). *Tillandsia chrysostachys* Bak. in Bot. Mag. cxii. t. 6906 (1886). *Tillandsia trinitensis* Bak. Brom. 211 (1889).

TRINIDAD: *Fendler 820* (Mez!).
[Peru.]

5. **V. macrostachya** (Bello) Mez. One meter or more high: leaves 1 m. long; sheath large, dark brown; blade ligulate, 8 cm. broad, rounded-apiculate, concolorous: scape very stout, erect, its bracts ovate-elliptic, acute, densely imbricate: inflorescence simple, 5–7 dm. long, many-flowered; rhachis over 1 cm. thick at base; floral bracts broadly ovate, 6 cm. long, about equaling the sepals, ecarinate, coriaceous: flowers spreading with stout pedicels 13 mm. long; sepals ovate, obtuse, 42 mm. long, 17 mm. wide: coma whitish.—Mez in DC. Mon. Phan. ix. 601 (1896). *Caraguata macrostachya* Bello in Anal. Soc. Esp. Hist. Nat. xii. 122 (1883).

TRINIDAD: Las Lapas, off the Blanchisseuse road, 1927, *Broadway 7361* (G).
[Cuba, Porto Rico, Venezuela.]

Epiphytic.

6. **V. Broadwayi** L. B. Smith (see p. 149). Five dm. high: leaves 3 dm. long; sheath elliptic, densely and minutely ferruginous-lepidote throughout; blade narrowly lanceolate, acuminate, 2 cm. wide, glabrous above, scantly lepidote below: scape erect, slender; scape-bracts densely imbricate, sparsely lepidote, the lower foliaceous, the upper broadly elliptic, apiculate, pale brown: inflorescence simple, racemose, strongly secund, 7–9 cm. long, laxly 5–7-flowered, minutely ferruginous-lepidote; rhachis flexuous; floral bracts broadly ovate, abruptly acute, brown, up to 22 mm. long, distinctly shorter than the sepals, secund with the flowers: flowers with stout pedicels; sepals broadly elliptic, obtuse, 18 mm. long, subcoriaceous, faintly nerved, dark brown except for the pale margin; petals not known: capsule subcylindric, 35 mm. long. Pl. I, figs. 9–10.

TRINIDAD: Heights of Aripo, 1922, *Broadway 9916* (Trin, TYPE; phot. G; K; NY); Mt. Tucuche, 1920, *N. L. Britton, Hazen & Mendelson 1258 in part* (G); 1929, *Broadway 7096* (K).
[Endemic.]

Epiphytic.

7. **V. albiflora** Ule. Over 1 m. high: leaves 6 dm. long, blade ligulate, 7 cm. wide, flat, rounded-apiculate, subglabrous: scape erect,

stout, its bracts elliptic, acute, imbricate: inflorescence laxly bipinnate; primary bracts lanceolate, much shorter than the spikes: spikes suberect, linear, 25 cm. long, 2–3 cm. broad, compressed, prophyllate; floral bracts lanceolate, 25 mm. long, equaling the sepals, keeled, glabrous, even, imbricate: flowers erect; sepals narrowly elliptic, acute, coriaceous; petals ligulate, bearing 2 scales 10 mm. from the base, white; stamens and style included: capsule short, equaling the sepals.—Ule in Verhandl. Bot. Ver. Brandenb. xlviii. 141 (1907). *Tillandsia rhododactyla* Mez, Fedde Rep. Spec. Nov. xvi. 76 (1919).

TRINIDAD: near Tamana, 1868, *Herb. Trin. 2008 in part* (Trin); Tamana forest, 1915, *Broadway 7806* (Trin, NY).
[Guiana, Brazil, Peru.]

Epiphytic.

8. **V. procera** (Mart.) Wittm. Fully 1 m. or more high: leaves 4 dm. long, sublinear, 6 cm. wide above the large ovate sheath, rounded-apiculate, glabrate, green: scape-bracts leaf-like, mostly exceeding the internodes: inflorescence laxly paniculate, its branches flexuous, slender; floral bracts 28 mm. long, shorter than the sepals, elliptic, acute, ecarinate, enfolding the base of the flower: flowers spreading, remote, 35 mm. long; sepals oblong, rounded; petals yellow, scales lanceolate: coma brownish.—Wittm. in Engl. Bot. Jahrb. xiii. Beibl. 29, 21 (1891), as *Vriesea*. *Tillandsia procera* Mart. in R. & S. Syst. vii. 1224 (1830). *Vriesia gracilis* Gaud. Voy. Bonite Atl. t. 67 (1846). *Tillandsia viscidula* Britton, Bull. Torr. Bot. Club, xlviii. 328 (1922).

TRINIDAD: forest, four miles east of Arima, 1920, *N. L. Britton, Hazen & Mendelson 596* (Trin); Moruga, 1921, *N. L. Britton & Broadway 2430* (NY, TYPE of *Tillandsia viscidula;* Trin); Usine St. Madeleine, San Fernando, 1925, *Broadway 5623* (FM, K); Maracas road to the Bay, on the ridge, 1926, *Broadway 6135* (S, K); near no. 6 bridge, Cumuto road, Cumuto, 1931, *Broadway 7717* (G); indefinite, *Broadway* (Mo); *2774* (Mez!).
[British and Dutch Guiana, Brazil.]

Epiphytic.

9. **V. paniculata** (L.) Mez. Stemless, 1 m. high or less: leaves rosulate, linear-lanceolate, acute or acuminate, up to 60 cm. long, 4–6 cm. wide: scape erect, its bracts leaf-like, densely imbricate: inflorescence usually compound and few-branched; spikes laxly few-flowered, erect; floral bracts ovate-acuminate, exceeding the sepals, ecarinate, straight, partially enfolding the flowers, not at all imbricate, submembranaceous: flowers 6–9 cm. long, with stout pedicels 6 mm. long; sepals 35 mm. long, elliptic, acuminate, subpungent; petals long, flaccid, pendent, white.—Mez in DC. Mon. Phan. ix. 614 (1896), as *Vriesea panniculata*. *Roncalmia paniculata* L. Sp. Pl. 286 (1753).

TRINIDAD: indefinite, *Broadway 3235* (Mez!).
[Antilles, Panama, Colombia.]

5. **GUZMANIA** R. & P.

Leaves densely rosulate, entire, sheaths conspicuous. Inflorescence various, spikes always polystichous. Flowers perfect. Sepals usually somewhat connate. Petals connate or closely conglutinated, naked, yellow or white. Stamens usually included, filaments more or less fused to the petals. Ovary wholly superior, pyramidal, ellipsoid or ovoid, glabrous. Ovules many, densely glomerate. Capsule septicidal. Seeds with a long straight usually brownish coma.—Fl. Peruv. iii. 37, t. 261 (1802).

About 80 species. Chiefly Andean with outlying species in Central America, the Antilles, Venezuela, Guiana and the Amazon Basin.

KEY TO SPECIES.

1. Inflorescence simple.
   2. Inflorescence short, corymbiform.....1. *G. lingulata.*
   2. Inflorescence cylindric, bracts membranous.....2. *G. monostachia.*
1. Inflorescence compound.....3. *G. megastachya*

1. **G. lingulata** (L.) Mez. Stemless, 3 dm. high: leaves 3–4 dm. long, obscurely punctulate-lepidote, blade lingulate, acute, 3–4 cm. wide: scape stout, erect, often short, its bracts leaf-like, densely imbricate: inflorescence short, corymbiform, 7 cm. broad; outer bracts lanceolate, forming an involucre which wholly conceals the flowers, red-tinged; floral bracts shorter than the flowers, linear, cucullate: flowers erect, short-pedicelled, 45 mm. long, sepals free, 17 mm. long, narrowly linear, rounded, glabrous; petals linear, cucullate, white; ovary ellipsoid: capsule subellipsoid, 3 cm. long, short-beaked; coma reddish brown.—Mez in DC. Mon. Phan. ix. 899 (1896). *Tillandsia lingulata* L. Sp. Pl. 286 (1753). *Caraguata lingulata* Lindl. in Bot. Reg. xiii. sub. t. 1068 (1827).

TRINIDAD: vicinity of Valencia, 1921, *Britton, N. L. & E. G. 2089* (G, NY); Quare River, 1922, *Williams 10681* (Trin); Long stretch, via Valencia, 22–23 mile posts, 1928, *Broadway* (Mo); indefinite, *Fendler 836* (Mez!). TOBAGO: indefinite, 1918, *Williams* (Trin); *Eggers 5799, 5861b* (Mez!).
[Central America, Antilles, Colombia, Venezuela, Guiana, Brazil.]

Epiphytic.

2. **G. monostachia** (L.) Rusby. Stemless, 2–4 dm. high: leaves rosulate, obscurely punctulate-lepidote, soon glabrous; sheaths broadly ovate, brownish; blades linear, 20 mm. wide, acute, yellowish green: scape erect, its bracts ovate, acute, imbricate, pale green: inflorescence of a single elongate polystichous spike, cylindric, 8–15 cm.

long, sterile toward apex; floral bracts imbricate, ovate, acute, membranous, the fertile ones pale green with conspicuous brown longitudinal stripes, about equaling the flowers, the sterile ones bright red: flowers erect, white, 23–29 mm. long; sepals joined equally for about 1/4 their length, 18 mm. long, obovate, broadly rounded, even, coriaceous; petals fused for most of their length, lobes elliptic, broadly rounded; stamens included, filaments connate with the petals for most of their length: capsule cylindric, 2–3 cm. long.—Rusby ex Mez in DC. Mon. Phan. ix. 905 (1896), as *G. monostachya*. *Tillandsia monostachia* L. Sp. Pl. ed. 2. 410 (1762). *Guzmania tricolor* R. & P. Fl. Peruv. iii. 38, t. 261 (1802).

TRINIDAD: San Fernando, 1868, *Herb. Trin. 827* (Trin); Hort. Trin., 1890, *Broadway 4090* (Trin); Arima, 1904, *Dannouse* (Trin); Maracas road to the waterfalls, 1927, *Broadway 6598* (K); St. Augustine, 1929, *Beattie 12275* (Trin); St. Ann's, 1931, *Broadway* (G); Valencia road, near the Oropuche River, 1931, *Broadway 7585* (G); indefinite, *Crueger 3604* (Trin); *Fendler 821, 829; Ryan; Broadway 2676, 2729, 3233* (Mez!). TOBAGO: Mason Hall, riverside, 1913, *Broadway* (Trin, G, NY); *4688* (G); indefinite, *Eggers 5708, 5936; Meyer* (Mez!).
[Antilles, Venezuela, Colombia, Ecuador, Peru.]

Epiphytic.

3. **G. megastachya** (Bak.) Mez. Stemless, 7 dm. or more high: leaves 5 dm. long, obscurely punctulate-lepidote, linear, 4 cm. wide, acute: scape erect, stout, its bracts elliptic-lanceolate, acute, densely imbricate: inflorescence many-flowered, elongate, subcylindric, about 2 dm. long; branches much abbreviated; primary bracts broadly ovate, acute, 55–80 mm. long, exceeding the axillary spikes: spikes subsessile, polystichous-flowered; floral bracts subtriangular, 40 mm. long, equaling or exceeding the sepals, strongly carinate, submembranaceous: flowers 62 mm. long, subsessile; sepals free, linear, acute, strongly nerved; petals conglutinated into a narrow tube for most of their length, lobes narrowly elliptic, rounded; stamens included: capsule 37 mm. long, subclavate.—Mez in DC. Mon. Phan. ix. 928 (1896). *Tillandsia foliosa* Griseb. Fl. W. Ind. 597 (1864), not Mart. & Gal. (1843). *T. megastachya* Bak. in Journ. Bot. xxvi. 46 (1888). *T. magna* Bak. Brom. 210 (1889).

TOBAGO: indefinite, *Eggers 6936* (Mez!).
[Lesser Antilles.]

6. **CATOPSIS** Griseb.

Stemless herbs. Leaves densely utriculate-rosulate, entire, minutely appressed-lepidote, green, sheath large, ovate. Scape conspicuous.

Inflorescence usually bipinnate, rarely simple or tripinnate, exceeding the leaves, its branches polystichous-flowering. Flowers small or minute, sessile, perfect in the Trinidad species. Sepals free, usually obtuse, strongly asymmetric, glabrous. Petals free, naked. Stamens included, anthers ovate or elliptic. Ovary superior, broadly ovoid or ellipsoid in the perfect or fertile flowers, style shorter than the ovary or absent. Ovules few–many, long-caudate. Capsule septicidal. Seeds with coma folded over, their bases projecting from the capsule.—Griseb. in Goett. Nachr. 1864. 21 (1865).

About twenty species. Chiefly in Central America and the Antilles, with outlying species in Florida, northern South America, the Andes, and southern Brazil.

KEY TO SPECIES.

1. Leaves acute or acuminate: inflorescence definitely paniculate.
   2. Scape-bracts and primary bracts ovate-acute: sepals 12 mm. long ..... 1. *C. Berteroniana.*
   2. Scape-bracts and primary bracts narrowly lanceolate, acuminate: sepals 6 mm. long ..... 2. *C. nutans.*
1. Leaves rounded-mucronate: inflorescence simple or of only a few spikes ..... 3. *C. sessiliflora.*

1. **C. Berteroniana** (Schult. f.) Mez. About 8 dm. high: leaves 3 dm. long, blade 5 cm. broad, subtriangular, acuminate: scape erect, its bracts lance-ovate below, broadly ovate above, equaling or exceeding the internodes: inflorescence laxly bipinnate, 30 cm. long, 12 cm. wide; spikes long-stipitate, 6–30-flowered; primary bracts ovate-apiculate, much shorter than the sterile base of the spikes; floral bracts suborbicular, 8 mm. long: flowers perfect, suberect; sepals 13 mm. long, exceeding the petals, strongly asymmetric, even, yellowish; petals white, ovate-elliptic; style 1/3 as long as the ovary, ovary broadly ellipsoid: coma pale brown.—Mez in DC. Mon. Phan. ix. 621 (1896). *Tillandsia Berteroniana* Schult. f. in R. & S. Syst. vii. 1221 (1830). *Catopsis Mosenii* Mez in DC. Mon. Phan. ix. 622 (1896).

TRINIDAD: Aripo Savanna, 1920, *N. L. Britton, Broadway & Hazen 271* (NY); indefinite, *Fendler 819, Broadway 2773, 3238* (Mez!).
[Florida, British Honduras, the Antilles, British Guiana, Brazil.]

2. **C. nutans** (Sw.) Griseb. Stemless, 5 dm. high or less: leaves rosulate; sheaths broadly ovate; blades subtriangular, acuminate: scape slender, erect; scape-bracts narrowly lanceolate, acuminate: inflorescence laxly bi- or tripinnate; primary bracts like the scape-bracts, much shorter than the axillary spikes: spikes suberect, laxly flowered, long-stipitate; floral bracts broadly ovate, much shorter

than the sepals: flowers perfect, suberect; sepals broadly elliptic, 5–6 mm. long, strongly asymmetric, glabrous, nerved; petals elliptic, obtuse, white, slightly exceeding the sepals; ovary broadly ovoid.—Griseb. Fl. W. Ind. 599 (1864), not as used by Bak. *Tillandsia nutans* Sw. Prodr. 56 (1788).

TRINIDAD: woods of Morne L'Enfer, La Brea, *Crueger 2003* (Trin); Arima, 1901, *Dannouse* (Trin); Caparo, 1908, *Broadway 2675* (FM); Tabaquite, near El Paraiso, 1917, *Broadway 8949* (Trin); near Tabaquite, 1918, *Broadway* (Trin, G, NY); 1919, *Broadway* (NY); Maracas road to waterfall, 1924, *Broadway 5364* (FM, Mo); woods of Cumuto, 1–2 miles from railway south, 1925, *Broadway* (FM); indefinite, *Broadway 2806*, *Fendler 817* (Mez!).
[Antilles, Florida, Central America.]

Epiphytic.

3. **C. sessiliflora** (R. & P.) Mez. From 2 to 4 dm. high: leaves tubular-rosulate, 15 cm. long, blade sublinear, 22 mm. wide, rounded-apiculate: scape erect, its bracts remote: inflorescence simple or of only a few spikes, rhachis straight; floral bracts shorter than the sepals: flowers perfect, suberect, 10 mm. long; sepals suborbicular, 7.5 mm. long; petals ovate-lanceolate, slightly exceeding the sepals, white; style short but distinct; ovary large, ovoid.—Mez in DC. Mon. Phan. ix. 625 (1896). *Tillandsia sessiliflora* R. & P. Fl. Peruv. iii. 42, t. 271, fig. b (1802). *T. nitida* Hook. Exot. Fl. iii. t. 218 (1827). *Catopsis niitida* Griseb. Fl. W. Ind. 599 (1864). *C. nutans* as used by Bak. in Journ. Bot. xxv. 176 (1887), not Griseb.

TRINIDAD: Moruga, 1921, *N. L. Britton & Broadway 2443* (NY); Heights of Aripo, 1922, *Broadway 9914* (Trin, NY). TOBAGO: indefinite, *Eggers 5709*, *Broadway 4013*, *4354*, *4444*, *4831* (Mez!).
[Mexico and the Antilles to Peru and eastern Brazil.]

Epiphytic.

7. **BROMELIA** [Plum.] L.

Coarse herbs, spreading by subterranean stolons. Leaves usually rosulate, with large curved spines along the margin. Inflorescence sessile or stipitate, always paniculate, densely tomentose-lepidote in most species. Sepals free or somewhat united, obtuse or acute, rarely mucronulate. Petals dorsally united by the filaments, but their margins free, eligulate, fleshy in most species. Stamens included, often much conjoined by their filaments. Anthers narrow, acute. Ovary passing gradually into the thick pedicel, epigynous tube conspicuous to nearly lacking. Berry succulent, relatively large. Seeds few to many, flattened, naked.—Sp. Pl. 285 (1753).

Thirty-four species. Mexico and the Antilles to Argentina.

KEY TO SPECIES.

1. Inflorescence a densely capitate panicle, sessile, sunk in the leaf-rosette.....Subgenus *Karatas*.
2. Floral bracts shorter than the sepals: scales on the inflorescence ferruginous, coarsely lacerate.....1. *B. Karatas*.
2. Floral bracts longer than the sepals: scales on the inflorescence white, divided so finely as to appear hair-like.....2. *B. humilis*.
1. Inflorescence an elongate rather open panicle, definitely stipitate. Subgenus *Eubromelia*. 3. *B. chrysantha*.

1. **B. Karatas** L. PINGUIN. Leaves densely rosulate, very narrowly triangular: inflorescence densely capitate, subconical, deeply immersed in the center of the leaf-rosette, densely ferruginous-tomentose throughout: floral bracts distinctly shorter than the sepals, linear-oblong, acute, spinulose-serrate: flowers 55 mm. long, passing indistinguishably into a short thick pedicel; sepals coriaceous, free, acute, entire, 22–25 mm. long; petals narrowly lanceolate, fleshy, glabrous, 30 mm. long, definitely exceeding the sepals, united for more than half their length; ovary few-seeded; style thick, trigonous: berry 80 mm. long, 20 mm. thick, greenish yellow, edible.—Sp. Pl. 285 (1753).

TRINIDAD: St. Ann's, 1923, *Broadway 5113*, 1922, *Broadway 5336* (FM). [Mexico and the Antilles to Colombia and British Guiana.]

In hard lands under trees. Fruits edible.

2. **B. humilis** Jacq. Plants relatively small, less than 1 m. in diameter, propagating by leafy stolons: leaves densely rosulate, the outer recurving, the inner suberect and usually tinged with red or purple; sheath triangular-ovate, pale-tomentose-lepidote or glabrous; blade narrowly triangular, spinose-serrate: inflorescence densely capitate, sessile, sunk in the center of the leaf-rosette, densely pale-tomentose-lepidote: floral bracts lanceolate to linear, equaling the sepals: flowers 5–7 cm. long; sepals free, erect, entire, narrow, 20 mm. long; petals fleshy, purple at apex becoming white below, 40 mm. long, linear, obtuse, glabrous, connate for 1/3 their length; ovary cylindric.—Enum. Vindob. App. 306 (1762).

TRINIDAD: Chacachacare, 1890, *Hart 3751* (Trin, NY). [Antilles, Venezuela.]

Terrestrial.

3. **B. chrysantha** Jacq. Terrestrial, 1–1.5 m. high: leaves densely rosulate, narrowly triangular: inflorescence scapose, paniculate, cylindric, ferruginous-tomentose; floral bracts broadly ovate, apiculate: flowers 45 mm. long, obscurely pedicellate; sepals broadly ovate,

mucronate, 10–12 mm. long; petals bright yellow, blade broad and conspicuous.—Hort. Schoenbr. i. 28, t. 55 (1797). *B. aurea* Britton, Bull. Torr. Bot. Club, xlviii. 328 (1922).

TRINIDAD: coastal hillside, western end of Monos Island, 1921, *Britton, N. L. & E. G., & Brown, M. S. 2736* (G, NY, TYPE of *B. aurea*).
[Venezuela, Colombia.]

8. **ARAEOCOCCUS** Brongn.

Low herbs. Leaves appressed-lepidote. Inflorescence laxly paniculate, scapose. Flowers small, inconspicuous. Sepals connate for half their length, rounded, glabrous. Petals free, reflexed at anthesis, eligulate. Stamens shorter than the petals, filaments free, anthers longer than the filaments, pollen grains ellipsoid with a pore at either end. Ovary terete, glabrous, no epigynous tube, style longer than the petals, stigma-lobes scarcely twisted. Ovules few (up to 10), borne at the top of the placenta, long-caudate. Seeds narrowly ovoid-cylindric, acute at either end.—Ann. Sci. Nat. ser. 2, xv. 370 (1841).

Four species. Trinidad, Tobago, Guiana, Brazil, Costa Rica.

1. **A. micranthus** Brongn. Leaves few, fasciculate, subpetiolate, spinulose-serrate, blades recurving, acute, 30–40 cm. long, 1–2 cm. wide: scape very slender, terete, erect; scape-bracts narrowly lanceolate, membranaceous, entire: inflorescence laxly subpyramidal, 15 cm. long, glabrous, its axes strongly geniculate, reddish: spikes laxly 3–8-flowered; floral bracts ovate, apiculate, 2–2.5 mm. long, spreading: flowers 5 mm. long, sessile; sepals 0.5–0.75 mm. long, suborbicular; petals 3–3.5 mm. long, with a short broad claw, abruptly acute; ovary subglobose, 2 mm. thick; ovules usually 2 in each cell: berry purple.—Ann. Sci. Nat. ser. 2, xv. 370 (1841).

TRINIDAD: Aripo Road via Arima, 4–5 mile posts, 1925, *Broadway 5708* (FM, S); 3–4 mile posts, 1927, *Broadway* (Mo); indefinite, *Prestoe 1672* (Trin). TOBAGO: the Widow, 1913, *Broadway* (G, NY); indefinite, *Hart 4143* (Trin).
[Guiana, the Amazon Basin.]

Epiphytic.

9. **HOHENBERGIA** Schult. f.

Mostly large showy herbs. Leaves densely rosulate, usually spinulose-serrate. Inflorescence scapose, compound. Spikes densely strobiliform, sessile or stipitate. Flowers sessile, compressed, mostly hidden by the floral bracts. Sepals strongly asymmetric, usually free. Petals nearly or quite free, naked. Pollen with 2 or 4 pores. Epigynous tube small or none. Ovules several to many in each cell.

Fruit dry, scarcely enlarged from the ovary.—Schult. f. in R. & S. Syst. vii. p. lxxi, 1251 (1830).

Twenty-seven species. Terrestrial and epiphytic. The Antilles, Venezuela, Guiana and Brazil.

1. **H. oligosphaera** (Bak.) Mez. Leaves about 1 m. long, 75 mm. wide, abruptly acute or rounded-apiculate, spines 1–3 mm. long, independent sclerenchyma bundles present: inflorescence tripinnate; primary bracts reflexed, broadly triangular, much exceeding the lower branches; spikes subglobose, stipitate; floral bracts with suborbicular base, contracted into a long-acuminate apex, 25–30 mm. long, purple: sepals acute, glabrous, carinate, 15–18 mm. long, the posterior ones distinctly longer than the anterior; petals acute, violet-purple; anthers acute; ovary glabrous.—Mez in DC. Mon. Phan. ix. 124 (1896). *Acchmea oligosphaera* Bak. Brom. 48 (1889). Pl. I, fig. 8.

TRINIDAD: Hort. Trin., 1890, *Broadway 3961* (Trin); Moruga, Edward Trace, 1916, *Broadway 8203* (Trin); forest, vicinity of Tabaquite, 1921, *N. L. Britton, Freeman & Nowell 2581* (NY, Trin, G). TOBAGO: Mason Hall, near the river, 1913, *Broadway 4517* (FM); 1914, *Broadway 4834* (US).
[Venezuela.]

Epiphytic.

10. **WITTMACKIA** Mez.

Large showy herbs. Leaves rosulate, abruptly acute or rounded, closely serrate. Scape central, often decurved, its bracts membranaceous. Inflorescence laxly bipinnate, composed of several elongate laxly polystichous spikes. Floral bracts minute, narrowly acuminate. Sepals nearly or quite free, mucronate, the right side extended into a broad membranaceous wing. Petals free, narrowly acute, recurved at anthesis, eligulate. Ovary glabrous, sessile, epigynous tube short. Style longer than the stamens. Ovules crowded, obtuse. Fruit dry, scarcely changed from the ovary. Seeds many, curved, obtuse, naked. —Mez in Mart. Fl. Bras. iii. pt. 3, 274 (1891).

Three species. The Antilles and Costa Rica to Guiana and Brazil.

1. **W. lingulata** (L.) Mez. Leaves about 1 m. long, 5–10 cm. wide, rounded-apiculate, finely spinulose-serrate: scape slender, at first light-floccose, later glabrous; scape-bracts membranaceous, lanceolate, entire or sparingly fine-dentate: inflorescence ample, its branches suberect to spreading and often arching; primary bracts spreading; floral bracts narrowed from a broadly ovate base into a bristle-like point, about equaling the ovary: flowers 12–18 mm. long, sessile; sepals glabrous, 3 mm. long without the terminal spine; petals 7–10

mm. long, acute; stamens shorter than the petals, anthers mucronate; ovary ellipsoid-cylindric to clavate, 7 mm. long.—Mez in Mart. Fl. Bras. iii. pt. 3, 275 (1891). *Bromelia lingulata* L., Sp. Pl. 285 (1753). *Billbergia odora* Miq. in Linnaea, xviii. 377 (1844). *Chevalliera lingulata* Griseb. Fl. Br. W. Ind. 591 (1864). *Acchmea lingulata* Bak. in Journ. Bot. xvii. 164 (1879). *Wittmackia odora* Mez in Mart. Fl. Bras. iii. pt. 3, 277 (1891).

TRINIDAD: Marabella, 1865, *Crueger 2000* (Trin); Santa Cruz Valley, 1874, *O. Kuntze 662* (NY); Moruga, Edward Trace, 1916, *Broadway 8204* (Trin); base of Mt. Tamana, 1920, *Britton, N. L. & E. G., & Hazen 1962* (NY, G); *Freeman 9070* (Trin); indefinite, *Fendler 833; Prestoe; Broadway 3236* (Mez!). TOBAGO: Mason Hall, near the river, 1914, *Broadway 4829* (NY, Bk); indefinite, *Eggers 5741; Meyer* (Mez!).
[Lesser Antilles, Costa Rica, Guiana, northern Brazil.]

Epiphytic.

11. **GRAVISIA** Mez.

Stemless plants with densely rosulate, linear, spinulose leaves. Scape central, large, its bracts entire. Inflorescence twice or thrice pinnate, many-flowered. Sepals free, erect, asymmetric, short-mucronate. Petals free, erect, bearing two coarsely crenate or deeply incised scales near the base. Stamens included, the first series alternate with the petals and free, the second more or less fused to the petals. Pollen grains with more than 5 pores. Ovary sessile, epigynous tube conspicuous. Ovules many, caudate, borne on the upper half of the placenta.—Mez in Mart. Fl. Bras. iii. pt. 3, 299 (1892).

Eight species. Antilles, Costa Rica, and northern South America.

KEY TO SPECIES.

Inflorescence dense, subglobose: primary bracts broad, suborbicular. 1. *G. aripensis.*
Inflorescence elongate with its lower branches remote: primary bracts lanceolate. 2. *G. aquilega.*

1. **G. aripensis** N. E. Brown. Leaves 6–10 dm. long; blade abruptly acute, mucronate, 5 cm. wide, teeth 1 mm. long: scape erect, 7–10 mm. thick, densely brown-lanate; scape-bracts slightly imbricate, broadly ovate, bright pink, soon glabrous: inflorescence dense, subglobose, 7–8 cm. long; primary bracts resembling the scape-bracts, suborbicular, almost entirely concealing the axillary branches; branches obscurely compound, densely fasciculate, many-flowered: floral bracts ovate-lanceolate, acute with a terminal mucro 3–4 mm. long, brown-lanate: sepals 15 mm. long, brown-lanate; petals exceed-

ing the sepals, deep blue, mucronate.—N. E. Brown in Bull. Torr. Bot. Club, liii. 466 (1926). Pl. II, figs. 13–14.

TRINIDAD: slopes of Aripo, 1921, *Freeman & Broadway* (Trin); Heights of Aripo, 1922, *Broadway 9917* (Trin, TYPE; phot. G); 1928, *Broadway 6894* (Mo); indefinite, 1862, *Crueger 1748* (Trin).
[Endemic.]

Epiphytic. On the basis of *Crueger 1748*, Mez records *Gravisia exsudans* (Lodd.) Mez from Trinidad, but a comparison of this specimen with the original plate by Loddiges shows the same differences as between it and *G. aquilega* as indicated in the foregoing key.

2. **G. aquilega** (Salisb.) Mez. Plant 1 m. or more high: leaves 1–1.5 m. long, 5–10 cm. wide: scape stout, densely farinose: inflorescence of 10–20 stipitate heads, interrupted-thyrsoid, 4 dm. long; primary bracts lanceolate, broad, reflexed, bright pink, the lower ones much exceeding the axillary heads; floral bracts ovate, pungent, shorter than the sepals, glabrous: flowers 36 mm. long, glabrous; sepals 14 mm. long, pungent; petals mucronate, flavous; ovary 10 mm. long, trigonous.—Mez in Mart. Fl. Bras. iii. pt. 3, 300 (1892). *Bromelia aquilega* Salisb. Parad. Lond. t. 40 (1805). *Aechmea aquilega* Griseb. Fl. Br. W. Ind. 592 (1864).

TRINIDAD: Marabella, 1868, *Finlay 1999* (Trin); Monos, 1889, *Broadway 3509* (Trin); Hort. Trin., 1889, *Broadway 3631* (Trin); 1890, *Broadway 3962* (Trin); Chaguanas, 1890, *Herb. Trin. 4213* (Trin); Aripo Savannah, 1893, *Broadway 5341* (Trin); Hort. Trin., *Herb. Trin. 5571* (Trin); Patos, 1917, *Williams* (Trin); 1924, *Williams, R. O. & A. A. 10716* (Trin); Teteron Bay, 1920, *N. L. Britton 481* (G, NY); Manzanilla, 1921, *Britton, N. L. & E. G. 2192* (G, NY); Oropuche, via Valencia, 1925, *Hombersley* (Mo); indefinite, *Fendler 841 in part, Broadway 2187* (Mez!). TOBAGO: Caledonia, *Herb. Trin. 5572* (Trin); Government House grounds, 1910, *Broadway 3639* (NY); indefinite, *Eggers 5677* (NY); *Meyer* (Mez!).
[Venezuela, Guiana, northern Brazil.]

Epiphytic.

12. **AECHMEA** R. & P.

Large or medium-sized stemless herbs. Leaves rosulate, usually linear. Scape usually conspicuous. Inflorescence of various types. Flowers usually sessile. Sepals often asymmetric, usually mucronate. Petals free, bearing two scales near the base or high up. Second series of stamens more or less joined to the petals. Pollen grains with 2 or 4 pores. Style shorter than the stamens, stigma lobes linear, often twisted. Ovules caudate or obtuse. Fruit usually dry. Seeds small, rugose, dark-colored, naked.—Fl. Peruv. Prodr. 47, t. 8 (1794).

Apparently 120 to 130 species. Mexico and the Antilles to northern Argentina.

KEY TO SPECIES.

1. Inflorescence compound.
   2. Sepals wholly unarmed: branches of the inflorescence polystichous-flowered.....Subgenus *Lamprococcus*. 1. *Ae. fulgens*.
   2. Sepals mucronate at apex: branches of the inflorescence distichous-flowered.
      3. Margins of the floral bracts free from the rhachis. Subgenus *Euaechmea*.
         4. Floral bracts large, forming a tubular sheath about the ovary: branches of the inflorescence short and densely flowered.....2. *Ae. Mertensii*.
         4. Floral bracts minute, much shorter than the ovary, nearly flat: branches of the inflorescence long and laxly flowered.....3. *Ae. porteoides*.
      3. Margins of the floral bracts joined to the rhachis: rhachis excavated.....Subgenus *Platyaechmea*.
         5. Spikes long-stipitate.....4. *Ae. dichlamydea*.
         5. Spikes sessile or very short-stipitate.....Var. *trinitensis*.
1. Inflorescence simple, spicate.
   6. Sepals mucronate at apex, usually free.....Subgenus *Pothuava*. 5. *Ae. nudicaulis*.
   6. Sepals unarmed.....Subgenus *Macrochordium*. 6. *Ae. bromeliaefolia*.

1. **Ae. fulgens** Brongn. Leaves densely rosulate, 4 dm. long, 65 mm. wide, subensiform, minutely serrulate, rounded-apiculate: scape erect, glabrous, its bracts lanceolate, entire, roseate: inflorescence compound at base, simple for the upper half, about equalling the leaves, glabrous, red: spikes loosely 3–8-flowered, polystichous; floral bracts none: sepals 5 mm. long, rounded-emarginate, asymmetric, violet; petals 12 mm. long, erect, rounded, ligulate at base, violet changing to red; ovary ellipsoid, 7 mm. thick, epigynous tube conspicuous; ovules long-caudate, borne high in the ovary: berry scarcely enlarged from the ovary.—Brongn. in Ann. Sc. Nat. ser. 2, xv. 371 (1841), as *Aechmaea*.

TRINIDAD: Hort. Trin., 1888, *Broadway 2990* (Trin); 1890, *Broadway 4354* (Trin).
[Northern Brazil.]

Epiphytic. Introduced in cultivation.

2. **Ae. Mertensii** (Meyer) Schult. f. Leaves bulbous-rosulate, 2–6 dm. long; sheath large, ovate; blade 2–5 cm. wide, coarsely spinose-serrate, abruptly acute, mucronate: scape erect, bearing at its apex a tuft of reflexed lanceolate red remotely serrulate bracts: inflorescence at first dense, often becoming lax at maturity, 5–20 cm. long, 4–5 cm. wide, branches densely 4–12-flowered; floral bracts broadly reniform, long-spinose, enfolding the ovary: flowers 12–17 mm. long; sepals free, mucronate, 4–6.5 mm. long; petals yellow,

erect, mucronate, 11 mm. long, their scales fimbriate; ovary subclavate, glabrous, epigynous tube short but distinct; ovules few, long-caudate, borne high in the ovary.—Schult. f. in R. & S. Syst. vii. 1272 (1830). *Bromelia Mertensii* Meyer, Fl. Essequeb. 144 (1818). *Aechmea spicata* Mart. in R. & S. Syst. vii. 1273 (1830). *Ae. mucroniflora* Hook. in Bot. Mag. lxxxi. t. 4832 (1855).

TRINIDAD: Chaguanas, 1868, *Finlay 1998* (Trin); 1889, *Broadway 3714* (Trin); Piarco Savanna, 1893, *Broadway 5287* (Trin); Arima, 1905, *Dannouse* (NY); Princes Town, 1918, *Broadway* (Trin); Tabaquite, 1918, *Broadway* (NY); Dabadie, 1920, *Broadway* (NY); Valencia, 1920, *Britton, N. L. & E. G., & Hazen 1010* (NY); St. Ann's, 1924, *Broadway* (FM, Mo); Laventille upper lands, 1930, *Broadway 7745* (G); indefinite, *Fendler 842, 843* (K); 1930, *Broadway 7431* (G); *2607* (Mez!).
[Guiana, Amazon Basin.]

Epiphytic.

3. **Ae. porteoides** Britton. About 1 m. high: leaves firm, 8 dm. long; sheath large, broadly elliptic; blade linear, 4–5 cm. wide, acute, spinulose-serrate, the spines 2–4 mm. long, black: scape arching (Broadway), terete, densely white-floccose; its bracts broadly lanceolate, membranaceous, pink, deciduous: inflorescence paniculate, equaling or exceeding the leaves, cylindric, very delicately white-stellate-tomentose throughout; lower primary bracts like the scape-bracts, often deciduous, upper primary bracts small and acicular, little larger than the floral bracts; branches fasciculate, spreading, with long sterile base, slender, very laxly few-flowered, strongly geniculate, 6–8 cm. long; floral bracts long-aciculose from a minute ovate base, much shorter than the ovary: flowers 2–3 cm. long, erect or nearly so, sessile; sepals 8–10 mm. long, strongly asymmetric, striate, mucronate with a spine 2–3 mm. long; petals deep violet-purple, 18 mm. long, with two nearly entire scales at base; ovary about 1 cm. long, much enlarged in fruit.—Bull. Torr. Bot. Club, xlviii. 328 (1922). Pl. II, figs. 7–10.

TRINIDAD: Mt. Tucuche, 1893, *Broadway 1997* (Trin); 1920, *N. L. Britton, Hazen & Mendelson 1342* (NY, TYPE, Trin); Heights of Aripo, 1922, *Broadway 9915* (Trin, G, NY); St. Clair, 1913, *P. McLean* (Trin); Morne Bleu, 1921, *N. L. Britton, Freeman & Bailey 2274* (NY); Blanchisseuse Road, 1925, *Broadway 5590* (G, FM); 1926, *Broadway 6008* (Mo); Ortinola Estate, Maracas, 1931, *Broadway 7460* (G); indefinite, *Herb. Trin. 1751, 6620* (Trin).
[Endemic.]

Epiphytic and terrestrial.

4. **Ae. dichlamydea** Bak. Half a meter or more high: leaves 6–8 dm. long, 4–7 cm. wide above the broad subovate base, lingulate, broadly acute, serrulate: scape stout, erect, its bracts lanceolate,

entire, bright red, showy: inflorescence ample, laxly bipinnate, tomentose-lepidote; primary bracts like the scape-bracts, mostly shorter than the sterile bases of the spikes: spikes long-stipitate, distichous, up to 16 cm. long and 3 cm. broad, 5–20-flowered, the rhachis excavated and attached to the sides of the floral bracts; floral bracts boat-shaped but not keeled, strongly nerved, 12–15 mm. long, short-mucronate: flowers sessile; sepals nearly free, mucronate; petals yellow: berry globose, 7 mm. in diameter.—Bak. in Journ. Bot. xvii. 133 (1879). *Ae. bracteata* as used by Bak. Brom. 55 (1889), not Griseb.

TOBAGO: Lot 42, 1913, *Broadway* (G, Mo); road from Charlotteville to Speyside, 1925, *Williams 11142* (Trin); Menna, 1914, *Broadway* (Mo); indefinite, *Greg* (BM, TYPE, phot. G); *Meyer* (Baker!); *Clemens 29; Eggers 5872* (Mez!).

[Jamaica, the Lesser Antilles.]

Epiphytic.

Var. **trinitensis** L. B. Smith (see p. 145). Sterile bases of the spikes short and stout. Pl. I, fig. 3.

TRINIDAD: Hort. Trin., 1890, *Hart 4089* (Trin, TYPE, phot. G); 1889, *Broadway 3627* (Trin); indefinite, 1867, *Prestoe* (K); *Herb. Trin. 916* (Trin).

[Endemic.]

Epiphytic.

5. **Ae. nudicaulis** (L.) Griseb. Leaves 5 dm. long, 6–10 cm. broad above the narrow sheath, linear, apiculate, strongly spinose-serrate: scape slender, erect or arching, white-floccose, its bracts erect, elliptic-acute, entire, red, membranaceous, congested at its apex: inflorescence simple, polystichous, cylindric, fertile throughout; floral bracts minute or sometimes wanting, entire: flowers 22 mm. long; sepals free, mucronate, strongly asymmetric; petals 12 mm. long, yellow, acute, bearing the fimbriate scales 4 mm. from the base; ovary subglobose, epigynous tube conspicuous; ovules short-caudate, borne at the middle of the placenta.—Fl. Br. West Ind. 593 (1864). *Bromelia nudicaulis* L. Sp. Pl. 286 (1753).

TRINIDAD: St. Ann's, 1923, *Broadway* (FM); Chaguanas, 1889, *Broadway 3730* (Trin); Hort. Trin., 1889, *Broadway 3630, 3515* (Trin); Marabella Pasture, 1868, *Herb. Trin. 2001* (Trin); indefinite, *Herb. Trin. 2422* (Trin); 1874, *O. Kuntze* (NY); *De Schach, Fendler 834, 835* (Baker!). TOBAGO: indefinite, *Broadway 4830* (Mez!).

[Mexico and the Antilles to southern Brazil.]

Epiphytic.

6. **Ae. bromeliaefolia** (Rudge) Bak. Leaves 6–10 dm. long, 5 cm. broad above the large ovate sheath, linear, usually rounded by decay of the point, coarsely spinose-serrate: scape stout, densely

white-lanate, its bracts ovate-lanceolate, entire, densely imbricate: inflorescence simple, polystichous, densely cylindric, 7–15 cm. long, 35 mm. wide, fertile throughout, densely white-lanate; floral bracts broader than long, truncate, thickened, 2-keeled: flowers 17 mm. long; sepals 7 mm. long, joined at base for 2 mm., emarginate; petals 15 mm. long, erect, emarginate, greenish-yellow soon turning black, scales borne 5 mm. from the base, fimbriate; ovary tomentose; ovules borne high in the ovary, long-caudate.—Bak. in Benth. & Hook. f. Gen. iii. 664 (1883). *Tillandsia bromeliaefolia* Rudge, Pl. Guian. 32, t. 50 (1805). *Macrochordium melananthum* Beer, Brom. 146 (1857).

TRINIDAD: Cabacera de Aripo, 1869, *Herb. Trin. 2002* (Trin); 1873, *Herb. Trin. 698* (Trin); Arima, 1874, *O. Kuntze 988* (NY); Carapichaima, 1892, *Alexander 5723* (Trin); Balandra, 1922, *Freeman 10505* (Trin); indefinite, *Fendler 837; Prestoe* (Baker!).

[Venezuela, Guiana, Brazil, Paraguay, Bolivia, Argentina.]

Terrestrial or epiphytic in forest.

13. **ANANAS** Mill. Pineapple.

Leaves densely rosulate, scarcely enlarged at base, acuminate-pungent, spinose-serrate. Scape about equaling the leaves, spiny-bracted. Inflorescence densely strobiliform, crowned with a tuft of sterile bracts. Flowers sessile, violet or red. Sepals free, obtuse, slightly asymmetric. Petals free, erect, ligulate. Stamens included, pollen grains ellipsoid, with 2 pores. Ovary coalescing with the bracts and axis to form a fleshy compound fruit, epigynous tube short. Ovules borne near top of cell. Berry sterile in cultivated forms.—Gard. Dict. Abr. ed. iv. (1754).

A single rather variable species, native of Brazil and probably also the Guianas but widely cultivated.

1. **A. sativus** Schult. f. Typical specimens small, with fruit only slightly fleshy; cultivated specimens quite large, with a succulent fruit and aborted ovules.—R. & S. Syst. vii. 1283 (1830). *Bromelia Ananas* L. Sp. Pl. 285 (1753). *Ananassa sativa* Lindl. in Bot. Reg. xiii. sub t. 1068 (1827).

TRINIDAD: vicinity of Valencia, 1921, *Britton, N. L. & E. G. 2107* (NY).

Terrestrial; introduced and sparingly cultivated in Trinidad. Naturalized in the Mora Forest district.

14. **BILLBERGIA** Thunb.

Stemless plants. Leaves rosulate or rarely fasciculate, sheath large, blade linear, spinulose-serrate, often banded. Scape erect or

arching, its bracts red, membranaceous. Inflorescence simple or compound. Flowers showy. Sepals free, erect, usually obtuse. Petals free, actinomorphic or zygomorphic, bearing two scales, claw long, blade elliptic. Stamens exserted at anthesis, both series free, or the second joined to the petals only as high as the scales. Pollen grains with longitudinal folds, but no pores. Style exceeding the stamens, epigynous tube large. Ovules many, obtuse.—Decad. Pl. Bras. iii. 30 (1823).

About 50 species. Chiefly Brazilian with outlying species in the rest of South America and in Central America and Trinidad.

KEY TO SPECIES.

Inflorescence cylindric: petals becoming spirally recurved at anthesis: ovary verrucose.....1. *B. rosea.*
Inflorescence densely pyramidal: petals twisted, not spiral at anthesis: ovary not verrucose.....2. *B. pyramidalis.*

1. **B. rosea** Beer. Leaves 1 m. long, 50 mm. broad above the narrowly ovate brown sheath, densely and finely spinulose-serrate, conspicuously spotted: scape slender, nutant, densely white-farinose, its bracts ovate-lanceolate: inflorescence simple, spicate, many-flowered, white-farinose throughout; bracts 4 mm. long, semiorbicular, obtuse: flowers sessile, 85 mm. long, erect; sepals narrowly triangular, 12, 10, and 10 mm. long respectively, verrucose; petals 65 mm. long, acute, with crenate scales, yellowish green; ovary broadly ovoid, densely granulose: berry yellow, globose, 10 mm. in diameter.—Brom. 128 (1857).

TRINIDAD: indefinite, Hort. Kew (Mez!).
[Dutch Guiana.]

Introduced in cultivation.

2. **B. pyramidalis** (Sims) Lindl. Leaves tubular-rosulate, 1 m. long, densely and finely spinulose-serrate, 6 cm. broad above the ovate base, often spotted: scape erect, white-farinose, its bracts lanceolate: inflorescence simple, pyramidal, 15 cm. long, white-farinose, rhachis stout, straight; floral bracts minute, acute: flowers 65 mm. long, obscurely short-stipitate; sepals 17 mm. long, pale reddish, densely farinose; petals 52 mm. long, obtuse, red, twisted at anthesis, scales fimbriate; anthers 7 mm. long, linear; ovary subcylindric, densely farinose, epigynous tube short.—Bot. Reg. xiii. sub t. 1068 (1827). *Bromelia pyramidalis* Sims in Bot. Mag. xlii. t. 1732 (1815).

TRINIDAD: Hort. Trin., 1890, *Broadway 4405* (Trin); St. Joseph, cultivated, 1917, *H. Fuller 8951* (Trin).
[Eastern Brazil.]

Introduced in cultivation.

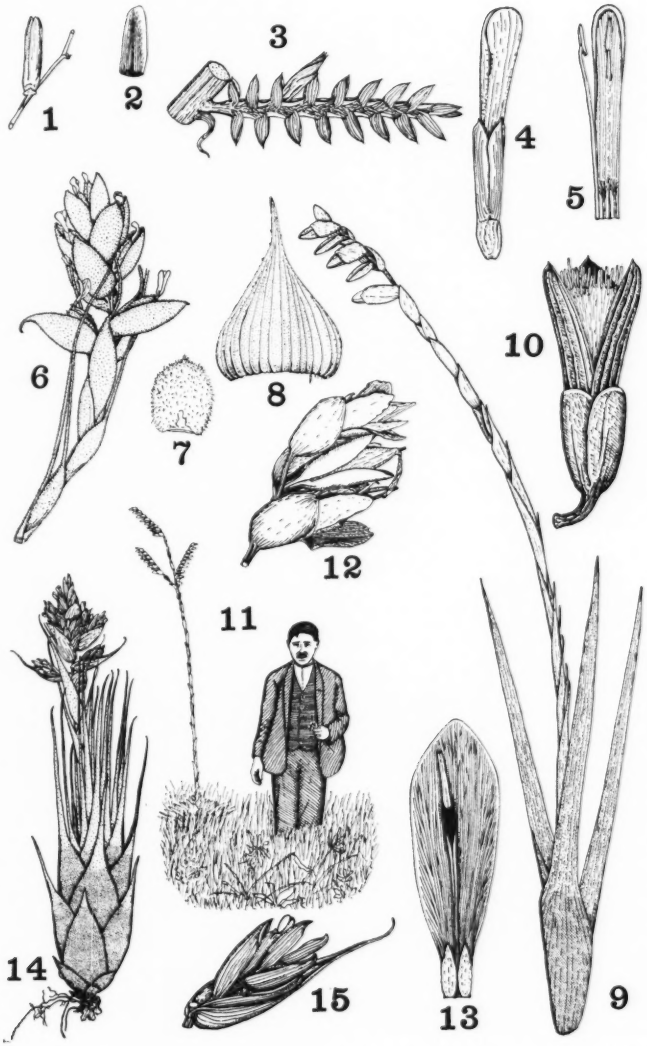
Explanation of Plates.

Plate I.

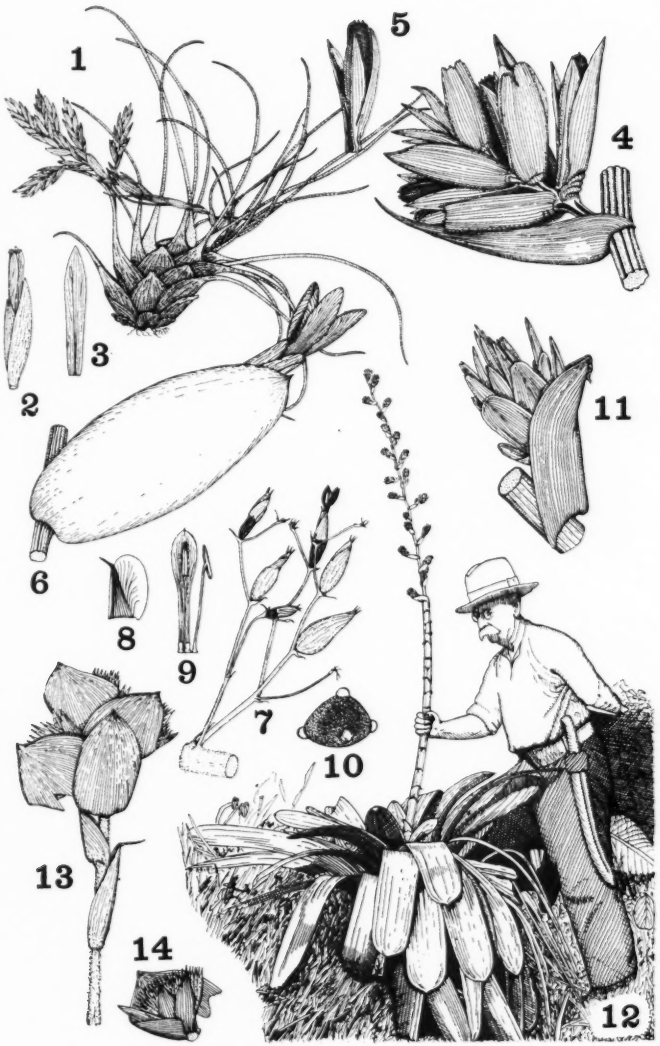
Fig. 1. Deuterocohnia Meziana O. Ktze. (*O. Kuntze*), flower and section of branchlet × 1.
2. Same, sepal × 1.
3. Aechmea dichlamydea Bak. var. trinitensis L. B. Smith (*Hart in hb. Trin. 4089*), spike × ½.
4. Canistrum minutum (Mez) L. B. Smith (*L. B. Smith, Hoehne & Kuhlmann 1829*), flower × 1.
5. Same, petal and stamens × 1.
6. Tillandsia latisepala L. B. Smith (*F. L. Herrera 3313*), inflorescence × ½.
7. Same, sepal × 1.
8. Hohenbergia oligosphaera (Bak.) Mez (*N. L. Britton, Freeman & Nowell 2581*), floral bract × 1.
9. Vriesia Broadwayi L. B. Smith (*Broadway in hb. Trin. 9916*), habit × ¼.
10. Same (*N. L. Britton, Hazen & Mendelson 1258*), flower and capsule × 1.
11. Vriesia Hoehneana L. B. Smith (designed from a photograph), habit much reduced.
12. Same (*L. B. Smith 1945*), terminal section of spike × ½.
13. Same (*Hoehne in hb. S. P. 4724*), petal and stamen × 1.
14. Tillandsia Archeri L. B. Smith (*W. A. Archer 1204*), habit × ¼.
15. Same, spike × 1.

Plate II.

Fig. 1. Tillandsia didistichoides Mez (*Fendler 827*), habit × ¼.
2. Same (*Broadway 7433*), floral bract and flower × 1.
3. Same, petal and stamen × 1.
4. Guzmania plicatifolia L. B. Smith (*Tonduz in inst. phys.-geogr. nat. Costaric. 12, 533*), spike × 1.
5. Same, flower and capsule × 1.
6. Guzmania rosea L. B. Smith (*Lehmann K 355*), floral bract and flower × 1.
7. Aechmea porteoides Britton (*Broadway 7460*), fascicle of branches × ½.
8. Same, sepal × 1.
9. Same, petal and stamens × 1.
10. Same, pollen grain × 250.
11. Glomeropitcairnia erectiflora Mez (*J. R. Johnston 303*), spike × ½.
12. Same (designed from a photograph), habit much reduced.
13. Gravisia aripensis N. E. Brown (*Broadway 9917*), habit × ¼.
14. Same, rear view of branch × ¼.



Figs. 1–2, DEUTEROCOHNIA MEZIANA O. Ktze.; 3, AECHMEA DICHLAMYDEA Bak. var. TRINITENSIS L. B. Sm.; 4–5, CANISTRUM MINUTUM (Mez) L. B. Sm.; 6–7, TILLANDSIA LATISEPALA L. B. Sm.; 8, HOHENBERGIA OLIGOSPHAERA (Bak.) Mez; 9–10, VRIESIA BROADWAYI L. B. Sm.; 11–13, V. HOEHNEANA L. B. Sm.; 14–15, TILLANDSIA ARCHERI L. B. Sm.



Figs. 1–3, TILLANDSIA DIDISTICHOIDES Mez; 4–5, GUZMANIA PLICATIFOLIA L. B. Sm.; 6, G. ROSEA L. B. Sm.; 7–10, AECHMEA PORTEOIDES Britton; 11–12, GLOMEROPITCAIRNIA ERECTIFLORA Mez; 13–14, GRAVISIA ARIPENSIS N. E. Brown.